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THE IRON TRADE REVIEW

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Effects of Widespread War

Are Being Discussed, But Iron Trade Moves Along Without Startling Developments—Ferro Buyers More Active

Although deeply interested in the European war news, the iron trade moves along calmly and does not share the excitement of the stock and grain markets. If the war is confined to Austria and Servia, the effects upon the iron market are not likely to be important, but if other nations should become involved, imports to this country would be checked and exports would expand. Some foreign products, including British sheets and tin plate, have already advanced somewhat. There is increased interest of consumers of ferro-manganese. If Russia should become involved and shipment of manganese ore from that country be interrupted, the prices of ferro-manganese would advance rapidly, as they did during the Russo-Japanese war, when the price was as high as $165 a ton, compared with the present price of $37 to $38.

Pig Iron

Cast iron pipe manufacturers have been the principal buyers of pig iron during the past week and have contracted for about 20,000 tons of southern grades. The pig iron market in most parts of the country is very dull. The International Steam Pump Co. is inquiring for from 3,000 to 4,000 tons of foundry grades for delivery to run to July of next year. Makers are slow to quote for such far-advanced delivery.

Railroad Buying

The American Bridge Co. has been awarded the contract for the Burlington railroad bridge across the Ohio, connecting Metropolis, Ill., and Paducah, Ky. Eighteen thousand tons of steel will be required. Car orders during the past week show some improvement, amounting to from 3,500 to 4,000, divided among a large number of roads. The Municipal Railways Co., New York, has ordered 4,100 tons of rails from the Bethlehem Steel Co. and is in the market for 15,000 tons additional. An inquiry for 16,000 tons of rails for export is pending. Large orders for track supplies are being placed.

Finished Materials

Recent advances in prices of wire products, shapes, plates and bars have had a good effect. Although new buying is light, specifications are coming in much more freely. On some products, particularly shapes and plates in eastern territory, the Pittsburgh basis is not rigidly adhered to for eastern shipment, but throughout a large territory in the central west the quotation of 1.15c is being held firmly and the market is much steadier. One effect has been to stop all efforts of large buyers to contract at less than 1.10c.

Sheets

Mills in the central west continue to quote on sheets at their plants and disregard the Pittsburgh base. For this reason, the usual quotation of 1.80c to 1.85c, Pittsburgh, on No. 28 black is sometimes shaded by valley mills for shipment to Cleveland and western points. The sheet market is, however, showing some indications of increasing firmness.

Structural Contracts

The contract for building two additional blast furnaces has been awarded by Corrigan, McKinney & Co., Cleveland, to the Variety Iron & Steel Works Co., that city. Easier money conditions in the New York district have resulted in some increase in structural business. There is still very active competition in fabricating and erecting and very low prices are being made.

THE OPEN HEARTH

Proposed Exemption of the Labor Trust

THE action of the Senate Judiciary Committee on the Clayton anti-trust bill has improved that remarkable document in some respects, but much in the way of amendment is still highly desirable.

One of the amendments which we are glad to commend is that relating to discriminations in prices. As passed by the House, section 2 of the bill provided that there should be no discrimination in prices between different purchasers of commodities in the same or different sections or communities except as to grade, quality, or quantity of the commodity sold, or on account of differences in the cost of transportation. The amendment adopted by the Senate committee provides that nothing contained in the bill shall prevent discrimination in price in the same or different communites made *in good faith to meet competition and not intended to create monopoly*. This is sound and recognizes that the aim of anti-trust legislation should be solely to prevent injustice due to obtaining a monopoly in commodities.

The sound policy followed in section 2 is, however, abandoned in section 7, the much discussed section relating to exemption of labor unions and other organizations. As passed by the House, this section exempted fraternal organizations and associations of consumers, as well as labor unions, agricultural and horticultural organizations. Section 7 as amended strikes out fraternal organizations and associations of consumers and inserts the word "lawfully" before the words "carrying out the legitimate objects thereof", so that nothing contained in the anti-trust laws shall be construed to forbid the existence and operation of labor, agricultural or horticultural organizations from *"lawfully"* carrying out their legitimate objects. This is harmless, for it was hardly supposable that the anti-trust laws would prevent any organizations from *lawfully* carrying out their legitimate objects. In other words, this part of the section merely says that certain organizations shall do that which is lawful. It is a sop to the labor unions, but it is not as objectionable as another clause retained by the Senate committee, as follows: "Nor shall such organizations or the members thereof be held or construed to be illegal combinations or conspiracies in restraint of trade under the anti-trust laws". The report of the committee states that its members believe that labor is not and ought not to be regarded as a commodity within the purview of anti-trust laws.

Why should not labor be considered as a commodity?

Legislation should be aimed to prevent monopoly of anything that can be used by a man for the oppression of his fellow men. If a labor union can make unjust demands and cause great loss to employers, the product of the union which its members have for sale should be subject to anti-trust laws just as rigorously as any other product. We believe that this principle will be sustained by the courts, and that for this reason, and also on account of other unconstitutional provisions of section 7, the section will be declared unconstitutional, if passed in its present form and reviewed by the highest courts of the land.

Dynamiting, grafting, like that being exposed at Chicago, and all of the worst abuses of labor unions are encouraged by any measure which provides for any kind of special favor for labor unions.

Hearings of the Industrial Commission

THE bulletin of the Pennsylvania Manufacturers' Association for July is a severe arraignment of the United States Commission on Industrial Relations which, for nine days, recently conducted hearings in Philadelphia. The bulletin charges that the hearings had every earmark of being "set up" against the employers of labor and in the interest of trade unions; that for every manufacturer or merchant who testified there were three agitators; that when a representative of one of the social reform or labor organizations was called to the stand, it was evident from the questions propounded to him that the witness had been thoroughly coached in advance; that

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the acting chairman did not properly maintain order at times during the hearings; that the manufacturer came without knowing what was expected of him and went away convinced that the commission's one purpose in subpoenaing him was to make it appear that he was a hard-hearted oppressor of the poor who had no other interest in life than dividends; that the chief concern of examiners seemed to be to ascertain why the employer was not enthusiastically in favor of the minimum wage and other radical legislation and why he insisted upon employing some non-union labor; that labor was represented by the unions and by the unions only, and in many instances, by men who are such notorious trouble makers that they cannot even be said to represent organized labor fairly, and that manufacturers who were subpoenaed were, as a rule, men who were known to have had serious trouble with labor organizations, while those who had had no trouble and would have been able to tell a story of peace and contentment within their mills and factories were carefully avoided by the writ servers of the commission.

These are serious allegations. If they were true, and if the commission continued to follow in other cities the policy adopted in Philadelphia, it would soon become a disgrace to the Nation. Fortunately, however, the hearings in Chicago seem to have been conducted in a different spirit. Leading organizations of employers co-operated in presenting evidence to the commission and President Walsh expressed himself as highly pleased with the co-operation of employers and employes. Even if the commissioners, or a majority of them, are prejudiced in favor of union labor, we believe the manufacturers have adopted the right policy at Chicago, and if it is adhered to at future hearings, much good may be accomplished by the investigation.

The index for volume LIV of THE IRON TRADE REVIEW, covering issues from Jan. 1 to June 30, 1914, is now ready for distribution. Copies of the index will be sent, as usual, to all whose names have been placed on the mailing list and to any other subscriber upon request.

Cutting Off Talk

RECENTLY the periodical agitation in favor of amending the rules of the Senate so as to limit debate has been revived. The latest advocate of the change is Senator Kern, of Indiana, the floor leader of the majority party, and his purpose was to hurry the consideration of the so-called anti-trust bills now pending in the Senate.

It is generally supposed that debate in the Senate is entirely unlimited. This would seem to be true, on account of the very long periods devoted to discussion. There is, however, one device to check unlimited discussion. This rule provides that "no Senator shall speak more than twice upon any one question in debate on the same day without leave of the Senate, which shall be determined without debate". In order to make this rule have any effect of importance, it is necessary to resort to the parliamentary expedient of recessing from one calendar day to another instead of adjourning, for when a recess is taken from time to time instead of adjourning, there is a continuous legislative day.

To expedite the passage of the pending bills, it has been decided to recess from day to day and probably no more will be heard of the plan to amend the rules of the Senate. Certainly, if each Senator speaks twice on each of the pending bills, that will be ample discussion and the country will be glad to have action taken.

Crucible steel made a poor record in 1912 as compared with 1910, while the tonnage for 1913 was only 291 greater than in 1912. The production of electric steel shows a good increase, the tonnage for 1913 being 31,180, compared with 18,309 in 1912. Compared, however, with 1910, the showing is not favorable, as in that year 52,141 tons of electric steel were produced. This large tonnage was due to the rolling of a considerable tonnage of steel rails by one company which has since sharply reduced its output of rails while awaiting experiments as to their wearing qualities. The number of new electric plants is, however, steadily increasing and three plants were being built on Dec. 31, 1913. In the preceding year, a gain of five plants had been made.

Prices Present and Past

Quotations on leading products today, average for last month, average for three months ago and average for July, 1913. Prices are those ruling in the largest percentage of sales at the dates named.

	Today's prices.	Average for June, 1914.	Average for April, 1914.	Average for July, 1913.
Bessemer pig iron, Pittsburgh..	$14.90	$14.90	$14.90	$16.65
Basic pig iron, Pittsburgh.....	13.90	13.90	13.90	15.25
No. 2 Fdy. pig iron, Pittsburgh	13.90	13.90	14.15	14.75
Northern No. 2 Fdy., Chgo.....	14.00	14.25	14.25	15.05
Lake Superior Charcoal, Chgo..	16.00	15.75	15.50	16.75
Malleable Bessemer, Chicago...	14.00	14.25	14.25	14.85
Southern No. 2, Birmingham...	10.00	10.37	10.43	10.45
Southern Ohio No. 2, Ironton..	13.25	13.50	13.50	14.20
Basic, eastern Pa.....	14.00	14.00	14.25	15.25
No. 2X Virginia furnace.....	12.50	12.75	12.75	13.00
No. 2X Foundry, Philadelphia.	14.60	14.75	15.00	15.50
Ferro manganese, Baltimore....	37.50	38.00	38.50	58.50
Bessemer billets, Pbgh. & Ygn..	19.00	19.75	20.80	26.50
Op. h'th sh. bars, Pbgh. & Ygn.	20.00	20.75	21.60	27.50
Bess. sheet bars, Pbgh. & Ygn..	20.00	20.75	21.60	27.50
Op. h'th billets, Pbgh. & Ygn..	19.00	19.75	20.80	26.50
Steel bars, Pittsburgh.....	1.15	1.11½	1.15	1.40
Iron bars, Philadelphia.....	1.17	1.17	1.22	1.47
Steel bars, Chicago.....	1.28	1.29	1.38	1.58
Tank plates, Chicago.....	1.28	1.28	1.32	1.63

	Today's prices.	Average for June, 1914.	Average for April, 1914.	Average for July, 1913.
Structural shapes, Chicago.....	$1.28	$1.28	$1.35	$1.63
Iron bars, Cleveland, local del'y	1.20	1.20	1.25	1.56
Iron bars, Chgo. mill.....	1.05	1.10	1.15	1.50
Beams, Pittsburgh	1.15	1.11½	1.18	1.45
Beams, Philadelphia	1.25	1.25	1.30	1.60
Tank plates, Pittsburgh.....	1.15	1.10	1.15	1.45
Tank plates, Philadelphia.....	1.25	1.25	1.30	1.65
Sheets, blk., No. 28, Pittsburgh.	1.80	1.82	1.92	2.25
Sheets, blue an., No. 10, Pbgh.	1.35	1.35	1.40	1.72
Sheets, galv., No. 28, Pbgh.....	2.75	2.80	2.92	3.32
Wire nails, Pittsburgh.....	1.55	1.50	1.60	1.70
Connellsville fur. coke, contr...	1.85	1.75	2.00	2.50
Connellsville fdy. coke contr....	2.40	2.35	2.50	3.00
Heavy melting steel, Pbgh.....	11.50	12.00	12.00	12.50
Heavy melting steel, east'n Pa..	10.25	10.75	11.00	11.50
Heavy melting steel, Chgo.....	9.50	9.75	9.50	10.50
Heavy cast, eastern Pa.....	12.25	12.50	13.00	13.25
No. 1 wrought, eastern Pa.....	11.75	12.50	13.00	14.25
No. 1 wrought, Chgo.....	9.00	8.88	8.50	10.50
Rerolling rails, Chgo.....	11.25	11.25	11.25	12.00
Car wheels, Chgo.....	10.75	11.25	11.00	17.00

(For Additional Prices See Page 224.)

Cast Pipe Makers Buy Pig Iron

Fair Tonnage Taken From Alabama Makers—Chicago Buying Aggregates a Considerable Amount—Steel Making Irons Very Dull

Philadelphia, July 27.—Small lot sales and inquiries for pig iron have become more numerous in this territory, and one or two makers report an enlargement of their bookings. The tonnage in the market, however, is not large, and prices do not improve. In fact, the general situation shows the same heavy and listless condition of many weeks' duration. The largest transactions in this territory continue to be the week-to-week purchases of the cast iron pipe makers. The largest of these consumers, including the United States Cast Iron Pipe & Foundry Co., R. D. Wood & Co. and the Standard Cast Iron Pipe & Foundry Co. either are buying some round lots of both northern and Alabama brands or are showing such interest as presages some good-sized purchases. Some tonnages of Alabama iron have figured in these sales, but the details are guarded. One lot of 1,000 tons of Alabama forge for quick delivery, however, was done at $13.70, delivered, or $9.50, Birmingham. A misfit accumulation of 1,000 tons of northern iron was closed with a forge consumer at special terms and small sales of forge at $13.75 and $14, delivered, are reported. More northern No. 2X business appears to be going at $14.75, Philadelphia, than at any other price, but this is not the bottom, and sales at $14.60, Philadelphia are noted, while it is understood some brands are obtainable at $14.50, delivered. A 500-ton sale of No. 3 was made to a Philadelphia shipyard at $14.40, delivered. An implement manufacturer asks 1,000 tons of southern No. 2 for eastern Pennsylvania and Western plants. About 3,500 tons of charcoal iron are pending. The Virginia market remains irregular. For No. 2X, $12.50, furnace, is easy, and for immediate shipment iron running 2.25 to 2.75 in silicon is offered at $12.25, furnace. Some resale Virginia iron offered at very low prices remains undisposed of. Some Virginia makers, however, apparently still hold out for $12.75, furnace for No. 2X. Basic iron is nominal in the absence of demand. A Philadelphia steel maker, who has been inquiring for 1,000 tons or more of Bessemer, is credited with having placed this order at about $15, delivered. Malleable has developed some lower prices in this district and a lot of 1,000 tons of prompt iron is offered by an eastern maker at $14.65, Philadelphia. Low phosphorus is active. One sale of 3,000 to 4,000 tons to a steel maker and smaller lots of standard iron are reported on the basis of $20.50, Philadelphia, and higher. Lebanon makers have been booking some good tonnages recently at $17 to $17.50, furnace, including two lots of 2,500 tons each. The Crucible Steel Co. is inquiring for 500 tons of low phosphorus. The Thomas Iron Co. has blown out its one active Hokendauqua stack.

Tonnage Falls Back

New York, July 28.—The metropolitan and surrounding markets in pig iron have flattened out since the heavy selling recently done at various consuming centers, especially by Buffalo makers, as recently noted. The needs of consumers appear to have been covered generally in these recent selling campaigns and at present only miscellaneous requirements are coming before the furnaces. As the result of recent heavy bookings, Buffalo makers remain firm at a minimum of $13, furnace, for all grades, and some of them are asking $13.25, furnace, for iron over 3.25 in silicon. Eastern Pennsylvania makers, however, still are competing sharply for orders in seaboard districts and $14.50, tidewater, for No. 2X is quoted freely and shading of this figure remains apparent. An Elizabethport buyer has bought some small lots, but

(*For complete prices see page 224.*)

has not disposed of its inquiry for 1,000 tons of foundry iron. A car company in the Boston territory wants 1,000 tons of malleable. A Westfield, Mass., buyer has closed against an inquiry for 3,500 tons of high phosphorus, the business going to an eastern Pennsylvania furnace, it is reported, and also recently placed an order for 3,500 tons or more of regular foundry grades with a Buffalo furnace. As far as known, the General Electric Co. inquiry for foundry iron for last quarter remains open. Reports from Alabama producers continue to show a heavier tonnage of sales. Cast iron pipe makers have been buying some round lots in the south, some recent transactions of this kind footing 15,000 to 20,000 tons, which were taken at a range of slightly below $9.25 to $9.50, Birmingham, for forge. One pipe order covered by these purchases was 11,000 tons for the government for Panama, which was taken by the United States Cast Iron Pipe & Foundry Co.

Prices Firmer at Buffalo

Buffalo, July 28.—Furnaces in the Buffalo district are holding more firmly to the scheduled prices than has been done in the past few weeks. Some of the interests are quoting $13.25 on No. 2X foundry, and sales are reported at that figure.

The placement for the week amounted to about 9,000 tons, and while the producers do not display the degree of optimism shown by the mills and agencies in the finished materials lines, they are inclined to the belief that better prices will develop on last quarter business. Orders are coming in for requirements over the current and last quarter from a number of melters, but most of the booking is for nearby needs and but little tonnage is being considered beyond the end of the year.

Slow at Cleveland

Cleveland, July 28.—One Cleveland agency sold 3,500 tons during the past week, including 1,000 tons of malleable. The market continues quiet with prices unchanged.

No Stir in Pittsburgh

Pittsburgh, July 28.—Decided dullness continues to feature the pig iron market in western Pennsylvania, and veteran sellers characterize July as one of the quietest months this year. There has been no buying of consequence since the latter part of June and details of reported sales refer to transactions closed 30 days ago. Prices, however, appear to be well pegged and it is believed they will hold, even though severely tested. Some talk of a couple of idle furnaces resuming operations is heard, but circulators of such reports appear to know more about future plans than furnace owners themselves.

Quiet at Cincinnati

Cincinnati, July 28.—The market is quiet and sales during the past week have been very low. Dealers are making special sales from time to time on business that has been secured more from personal solicitation than from general inquiry. Contracting for the second half is about over except for a few melters who are buying from hand to mouth or who have withheld purchasing because of the uncertainty of the market.

The United States Cast Iron Pipe & Foundry Co. is inquiring for 2,000 tons of southern foundry iron for its Addyston, O., plant. Southern iron is obtainable in limited lots at $10, Birmingham basis, for No. 2 foundry for prompt delivery, and $10.25, Birmingham basis, for this same grade is general for the last half.

Southern Ohio No. 2 foundry and basic iron is now being held at $13.50, Ironton basis, for either prompt or contract shipment. A little silvery iron has been placed in scattering lots at $16, furnace, for 8 per cent silicon.

Sales Continue

Chicago, July 28.—Inquiry for pig iron continues to come from a wide territory and sales aggregate considerable tonnage, although inquiries and sales are for smaller lots than usual at this season. With furnace plants, operating at about 50 per cent capacity, as has been the rule in this territory since Jan. 1, a number of pig iron makers have booked sufficient orders to keep their plants going on the same basis through last half. Northern No. 2 foundry and malleable continue on a basis of $14, Chicago furnace, which is not being shaded.

Southern pig iron is being sold by agents in this territory in somewhat larger measure than for several weeks past, but no round tonnages are under consideration. The market continues firm on a basis of $14.60, delivered, Chicago, for No. 2 foundry and it is believed no lower price is being made on this grade.

Following the announcement of a reduction in the pig iron rate from Birmingham to Chicago, a number of melters having contracts with southern makers asked that shipments be held up until after Aug. 15 when the new rate was to go into effect. With the postponement of the effective date to Oct. 1, most of these requests have been withdrawn. Southern makers took the ground that inasmuch as they had borne the burden of obtaining the reduction and would not profit by it on present contracts, melters should feel themselves bound to take the tonnage already contracted without delay. In almost every instance, the response to this argument was prompt and the request for delay in shipments was withdrawn.

The market is being pushed somewhat by sellers on the arguments that prices are at the bottom and buyers cannot hope to do better than present rates and are likely to find an advance before long.

Limited to Car Lots

St. Louis, July 28.—Inquiries for pig iron in the St. Louis market are scarce and limited to car lots. Southern No. 2 is quoted at $10.25 for the last quarter. Northern iron is offered at $14, Chicago, and $13.50, Ironton.

More Sold at Birmingham

Birmingham, Ala., July 27.—Larger tonnages of iron were sold in Birmingham during the past week than for some time. The largest week's business for one company heard of was between 5,000 and 6,000 tons, which, in view of conditions for the past several weeks, is regarded as very good.

The company is known to have sold some iron for $10, although only small orders of a few hundred tons, it is said. The prevailing quotation is $10.25, No. 2 southern, delivery through the remainder of the year. Some companies quote $10.50 for third quarter, but it is known they are selling for $10.25 to responsible parties who take fair-sized orders.

The market is regarded as of better tone with a slight though perceptible tendency toward stiffening in prices. No large inquiry, however, is reported by any of the local companies.

Iron Workers Strike

The Inside Iron Workers' Union of New York City, with a membership of about 6,000, put into effect a strike Monday, July 27, to enforce demands for a new wage scale and different working conditions. The members of the union generally have responded to the strike order. The union's demands are a nine-hour work day, five days in the week, and a five-hour work day on Saturday; a minimum wage scale of $20 a week for finishers, $16 for helpers and $12 for apprentices, a union agreement and sanitary shops. Many of the workers are recent immigrants.

(*For complete prices see page 224.*)

Sheet Reports Conflict

Some Mills Much More Favorably Situated Than Others

Pittsburgh, July 28.—From conflicting accounts of the steel sheet market, it is apparent that tonnages placed recently were not well distributed, for some mills appear to be occupying fairly comfortable positions, while others still are anxious to book additional orders, offering concessions, at times, in their efforts to obtain desired business. Mills that have taken the "lion's" share, are holding to maximum prices, and asking a trifle more in some instances, but on the other hand, reports of 1.80c, Pittsburgh, being shaded for base size black sheets are heard. New tonnage booked thus far this month compares favorably with that taken the corresponding period in June, but specifications have not been so brisk. Several large mills were idle the first half of this month.

Prices Advanced

Cincinnati, July 28.—Demand for sheets continues good and the mills are very much encouraged. The Newport Rolling Mill Co., Newport, Ky., has advanced its prices to 1.95c for black sheets No. 28 gage and 2.95c for galvanized sheets No. 28 gage, both Cincinnati basis. Other mills in this territory have been holding at these figures for several weeks. Blue annealed No. 10 gage are quoted at from 1.50c to 1.55c, Cincinnati basis. The American Rolling Mill Co., Middletown, O., is operating both plants at that place in full and will, about Aug. 1, re-open its Zanesville, O., plant, which is closed temporarily for repairs. The Portsmouth Steel Co., Portsmouth, O., which has also been closed for repairs, re-opened in full in all departments on July 27.

Expect Advance

Chicago, July 28.—Although sheet prices at present are showing no decided strength, mills are much better situated than for several months and it would not be surprising if the present low quotations would be withdrawn within a short time. Whether the advance will be $1 or $2 per ton remains to be seen, but with prices at the extreme low level now presented, the latter advance would bring them more nearly in line with other finished steel products. While the bulk of the business is going at 1.98c, Chicago, for No. 28 gage black, and 2.93c for No. 28 gage galvanized, sheets may be obtainable at 5 cents below this mark from some makers.

The principal maker of sheets in this territory is fairly well booked through third quarter and is not anxious to contract tonnage for fourth quarter, believing prices will be considerably higher when business for that period becomes active.

Slightly Firmer

Cleveland, July 28.—Sheet prices are slightly firmer but quotations remain about the same. Mills are quoting at their plants on a basis of 1.80c to 1.85c, Pittsburgh. In some cases, as, for example, for shipment from a Youngstown mill to Cleveland, a quotation of 1.80c at the mill is made on No. 28 black, which is equivalent to 1.75c, Pittsburgh.

Tonnage Holds in East

Philadelphia, July 27.—As this season is normally an active one for sheet buying, makers in eastern Pennsylvania continue to enter bookings in a fairly good volume and are maintaining practically full operations. Prices, however, remain very unsatisfactory, and there is some talk that an advance soon may be insisted upon. The usual basis of the eastern market is 1.50c, Philadelphia, or 1.35c, Pittsburgh, for No. 10 gage blue annealed.

War May Affect Ferro

But German and English Makers Refuse to Become Excited

New York, July 28.—Speculation among sellers and consumers of ferro-manganese, now is directed upon the probable effects upon the market for this material, which may arise from the threatening war conditions of Europe. If Russia is involved in the conflict, it generally is believed that the result will be a sharp advance in ferro-manganese, mainly because of the suspension of shipments of manganese ore from Poti to Europe and to this country. If the conflict should become international, the probability of shipments to this country of finished product from Germany and England, being checked, would render the situation more acute. The sky-rocket conduct of ferro-manganese in the Russian-Japanese war times, now is recalled. At this time, however, German and English makers of ferro-manganese are taking a complacent view of the situation, inasmuch as they continue to offer to consumers in this country, contracts for all 1915 delivery at prices which had been prevailing for this year's shipment, or $38, seaboard, for English and $37, seaboard, for German. Sales of about 1,500 tons of English ferro-manganese for shipment over 1915, have been closed at $38, seaboard, and other negotiations are in progress. A block of 5,000 tons for the Colorado consumer and 700 tons for an Indiana buyer, for next year, both referred to last week, remain unclosed.

Still Quiet

Pittsburgh, July 28.—The market for ferro-alloys at this point offers nothing of interest, and probably will not until the end of the year inasmuch as the bulk of the 1914 tonnage was sold seven months ago. The top of the market for ferro-manganese appears to be $37.50, although the $38, seaboard, quotation has not been withdrawn. If European wars assume, threatened proportions of ferro-manganese will be held at high premiums.

Russo-Japanese War Recalled

Cleveland, July 28.—Up to the present time, the most definite result of the declaration of war against Servia by Austria so far as the iron and steel markets are concerned is increased inquiry for ferro-manganese. Owing to the danger of Russia becoming involved and movement of ore from that country being prevented by the war, consumers in this country are becoming anxious as to their requirements. They recall that during the Russo-Japanese war ferro-manganese sold as high as $150 per ton.

Mills Ordered.—The Central Steel Co., Massillon, O., has placed an order with the National Roll & Foundry Co., Pittsburgh, with works at Avonmore, Pa., for three stands of 24-inch bar mills and tables. The mills will be used for rolling sheet bars. John C. Neale, formerly assistant general manager of sales for the Carnegie Steel Co., Pittsburgh, is president and general manager of the Massillon company, which is now building an open-hearth steel plant, as previously announced.

(For complete prices see page 224.)

Heavier Specifications

In Bar Products Following the Advance in Quotations—Buyers Have Some Doubts

Chicago, July 28.—Withdrawal of quotations below 1.33c, Chicago, by the leading interest, which has been generally followed by independent makers, has resulted in a considerably larger tonnage being specified than has been the case for some time. Expectation of an advance in finished steel caused considerable increase in specifications a week ago and this has continued since the advance was made, especially in the experience of those concerns which are not holding firmly to the advance during the remainder of this month. Although the leading interest and some of the independent makers will offer nothing under 1.33c, Chicago, some laxness is evident on the part of others, and tonnages may still be placed for immediate delivery at 1.28c, Chicago.

The market for hard steel bars is unsatisfactory, the demand being small and quotation remaining at 1.25c to 1.30c, Chicago.

Holding Bar Steel at 1.15c

Pittsburgh, July 28.—Bar steel is being held at 1.15c by all makers in this district, and a careful investigation has developed no instances of shading, except in cases where negotiations were about to be closed when the advance of July 20 was announced by the Carnegie Steel Co. Agricultural implement makers have practically covered needs for 1915, although contracting for this material has been comparatively light. Bar iron has showed no change this week.

Better Volume But Not Price

Philadelphia, July 27.—Iron mills in eastern Pennsylvania are doing slightly better in volume and in operations but not in price. Common iron bars continue weak and are selling at a range of 1.15c to 1.20c, Philadelphia, in carloads or larger lots.

Contracting for Bars at 1.15c.

Philadelphia, July 27.—Contracting for steel bars for third quarter and last half continues to go forward in this district. One middle western maker in the week closed for about 5,000 tons of this class, obtaining in all cases 1.30c, Philadelphia, or 1.15c, Pittsburgh. The largest tonnage was 1,000. One implement maker was included. All the leading bar mills are quoting 1.30c, Philadelphia, or 1.15c, Pittsburgh. Just about the time last week when the advance in bars was announced, however, a Schuylkill valley steel maker bought 800 tons of rivet rods for quick delivery and claims to have shaded 1.25c, Philadelphia, or 1.10c, Pittsburgh. Shafting shows weakness and two carloads have been placed in this district at 68 off.

Better Demand

Buffalo, July 28.—Mills and agencies in the Buffalo territory report a better demand for bars than is noted in the other lines. The price of 1.10c, base, has apparently disappeared from the market. Sales have been made and orders are pending at 1.15c, base, for third quarter needs, and some business has been booked for last quarter requirements at 1.20c, base.

The Attitude of Buyers

Cleveland, July 28.—Nearly all agricultural implement manufacturers in this part of the country are covered on steel bars, at least up to Jan. 1. The 1.15c, Pittsburgh, quotation on shapes, plates and bars is being adhered to in the Cleveland territory, but very little new business has developed. There has been, however, a gratifying increase in specifications against old contracts. One good effect of the announcement of the higher prices has been to prevent further attempts being made to obtain less than 1.10c, Pittsburgh. Buyers generally express some doubt as to whether the new quotation on shapes, plates and bars will be maintained, but many of them, especially those who covered at 1.10c before the advance to 1.15c was announced, will be glad to see the new prices maintained on account of the general stimulating effect it would have on the market.

Hoops, Bands, Cotton Ties and Shafting.

Pittsburgh, July 28.—The market for hoops, bands, cotton ties and shafting at Pittsburgh shows little change in position. It is reported that one hoop seller has sold material at 1.20c, but 1.25c continues to be the general asking price. Bands have been advanced to 1.15c by some makers. The cotton tie situation is unchanged. Specifications against contracts for cold rolled shafting have been coming out in better volume, and some talk of an advance in price is heard. Sizeable tonnages are being placed at 67 off list.

Iron Bars are Stronger.

Chicago, July 28.—The principal maker of iron bars in this district is holding its price at a higher level than recently and is booking business at 1.07½c to 1.10c, Chicago mill, with less desirable business commanding 1.12½c, Chicago. Demand for this class of goods has increased sufficiently to warrant higher quotation, but bars are still obtainable on a basis of 1.05c, Chicago, from other makers.

(*For complete prices see page* 224.)

Effect of War

Not Likely to be Serious in the Iron Ore Situation

New York, July 28.—Some attention is given by foreign ore sellers to the possible effect upon shipments to this country, resulting from an important European war. Most of the European ore coming to this country is from Sweden and Spain, or countries not likely to be affected even in the event of direct consequences. A number of English vessels are engaged, however, in the carrying of the ore from these countries to the United States and in the event of a general European conflict, these ships, undoubtedly, would be withdrawn from this traffic. Any cessation of European ore shipments to this country, no matter how complete, is not likely to be of serious importance at the present time, since the tonnage being received from that source is not so large as to be depended upon by eastern furnaces. Consumers continue to show a little interest in foreign or other ores in the eastern market.

July May Exceed June

Cleveland, July 29.—The July movement of ore will probably be a trifle in excess of that of June, though nearly all of it has been moved by the shippers themselves. Wild cargoes in this trade are as scarce as ever and there is no hope of improvement in this particular until the furnacemen come into the market in earnest. So far, they have bought very little ore.

May Advance Cast Pipe Rates

Washington, July 29. (By wire.)—Authority has been granted by the Interstate Commerece Commission to the Southern Railway Co., et al., to advance rates on cast iron pipe from southern producing points to points in New Jersey and Pennsylvania three cents per ton, without observing long and short haul provision.

Cast Pipe is Irregular

Volume of Demand Large in Some Districts, But Prices Vary Greatly

New York, July 28.—An erratic condition of trade prevails in the New York cast iron pipe market. While the volume has been good, it has appeared in so irregular a fashion that the market has not been improved and prices have continued weak. In some cases, less than $19, at the foundry, for 6-inch, are being made by eastern makers. No action has been taken on the first lot of 4,000 tons of miscellaneous sizes for a water works project at Guayiquil, Equador, bids for which recently were entered with J. G. White & Co., Ltd., London, who have the general contract for this project. The total pipe requirements of this contract are to run about 30,000 tons. Bids went in this week on 1,450 tons for Duxbury, Mass., on 675 tons of 24's for North Adams, Mass. The United States Cast Iron Pipe & Foundry Co. finally has been awarded the entire lot of 11,000 tons for the government for Panama delivery upon which it recently submitted the lowest price. This pipe is to be manufactured at southern plants.

More Business Appears

Chicago, July 28. — Municipalities, which have been somewhat slow in taking their requirements of cast iron pipe for this season's work, seem to be coming into the market more actively and in some cases a second purchase is being negotiated. Columbus, O., will open bids this week for 1,800 tons; St. Paul for 600 tons on Aug. 10, Lincoln, Neb., 280 tons on Aug. 1, and the city of Chicago is taking bids on 2,500 to 5,000 tons of 8 and 12-inch pipe, which will be opened this week.

The United States Cast Iron Pipe & Foundry Co. has been awarded 6,300 tons of pipe at Cincinnati.

Eastern Billets are Slow

Philadelphia, July 27. — Extreme sluggishness characterizes the market for rolling billets among eastern Pennsylvania makers. Consumers remain indifferent towards making forward contracts and are filling their needs by hand-to-mouth buying, which falls much short of giving the mills sufficient tonnage to operate to advantage. A Lebanon, Pa., buyer closed for 600 tons of high sulphur billets. Forging billets are making a somewhat better record, but this market also lacks animation. For rolling billets, the common quotation of eastern Pennsylvania makers is $21.90, Philadelphia, or $19.50, Pittsburgh, and on forging steel, $24.90 to $25.90, Philadelphia.

Shows No Change

Pittsburgh, July 28.—The market for semi-finished steel products in eastern Ohio and western Pennsylvania is dull, and will remain so until consumers renew contracts. Some consider the market at Youngstown slightly weaker than it is at this point, but there has been no actual test of quotations recently. It would be diffcult, however, to shade maximum prices at Pittsburgh mills.

Better Feeling at Ashland.

Ashland, Ky., July 28.—The Ashland Steel Co. is now operating full in all departments and the feeling in the market is much better. Business is a little improved, but demand is not altogether satisfactory. Billets and wire rods are unchanged at $20 for the former and $25 for the latter, both Ashland basis.

Plate Prices are Firmer

Number of Orders Placed in East is Larger—Buying Light in Central West

Pittsburgh, July 28.—Manufacturers of steel plates in western Pennsylvania are uniformly quoting this product at 1.15c, following the advance of July 20, announced by the Carnegie Steel Co. Some of the smaller mills, that were apparently willing to offer concessions a fortnight ago, have orders on their books that will keep them busy four or five weeks, and are not considering business at less than the general asking price. One of the leading companies reports new sales on that basis, although buying, as a general rule, has been light since prices were boosted $1 a ton. Specifications against contracts have been coming out in good volume, and, from this standpoint, July compares favorably with the preceding month. It is not believed new buying will be of much consequence until present tonnages are taken out.

Moving Better

Chicago, July 28.—The impetus given specifying in all lines of finished steel products by the withdrawal of quotations under 1.33c, Chicago, has had its effect on the plate market and an unexpected tonnage has been specified in the past few days. Indications are the market has turned from its low level and many users believe it would be better to buy at present prices than to delay and perhaps meet a further advance.

Orders Numerous, Tonnage Light

Philadelphia, July 27.—The number, if not the volume, of orders taken by eastern Pennsylvania plate makers the past week has shown an increase. The tonnage has been widely scattered, but is scarcely of consequential size. Large orders are very scarce. The shipyards and locomotive builders in this territory have been taking but little new business, though some negotiations continue. Some eastern mills have followed the lead of Pittsburgh and middle western makers in asking 1.30c, Philadelphia, or 1.15c, Pittsburgh. In some cases, this price has been diverged from to meet circumstances and there remains little doubt that 1.25c, Philadelphia, or 1.10c, Pittsburgh, may still be done without much trouble, especially for early delivery.

(*For complete prices see page* 224.)

Tin Plate Mills

Are Busy, But Very Little Buying is Being Done

Pittsburgh, July 28.—Except for the activity of mills, which is really the most important side of business to plant owners, the tin plate market is lifeless, and will probably continue in a comotose state until buying for 1915 begins. Excellent crop conditions give assurance that demand will continue during the canning season. Threatening war clouds abroad will materially increase tin plate demand, if they grow darker, but the trade is decidedly anxious to see the Austra-Servian differences settled without the necessity of war and its accompanying depressing effects upon general business.

Wm. R. McIlrain, a retired ironmaster, died at Reading, Pa., July 26, aged 73 years.

Demand for Foundry Coke

Indicates Some Increase in Melt and Improvement in Demand for Castings

New York, July 28.—One of the largest producers of foundry coke in this country observes, in a recent increase of specifications against its contracts, an evidence of some increase in melt in the general foundry industry. This has been so appreciable as to lead to the conclusion of this maker that some improvement in demand for castings generally has appeared. Some evidence of a better melt, apart from these coke requisitions, also has been seen in the east, notably in New England, where textile machinery builders are enjoying a better demand for their products and are increasing their operations.

Connellsville Coke Lifeless

Pittsburgh, July 28.—The Connellsville coke market is decidedly quiet, and prices appear to have lost some ground recently. Some operators are refusing to shade $2, ovens, for future delivery, but fuel is being offered for August shipment at $1.75, ovens, and reports of that figure being shaded for spot delivery are heard. No inquiries of importance are before the trade, and no sales of consequence have been made recently. The *Connellsville Courier* for the week ending July 18, says production was 268,200 tons, an increase of 3,595 tons compared with the week before.

Sale at St. Louis

St. Louis, July 28.—Seven thousand tons of furnace coke were sold here Friday. Foundry coke is at a standstill in the St. Louis market at $2.50 to $2.75.

Will Buy Aug. 3

Cincinnati, July 28.—The United Gas & Improvement Co., Philadelphia, which, as reported by THE IRON TRADE REVIEW last week, is inquiring for 50,000 tons of coke for distribution among its various plants throughout the country, will buy on Aug. 3. The coke market is quiet and sales are limited to those users who are buying from hand to mouth or who have postponed purchasing for next year's requirements. Very little coke is moving because only a small amount of iron is being purchased and used. Furnace coke is at a standstill, as no furnaces in Cincinnati territory are in need of fuel. A little Pocahontas furnace coke is obtainable for spot shipment at $1.80, ovens, and New River foundry coke is being offered at from $2.60 to $3.40, ovens, the lower price being for nearby shipment. Other prices are unchanged.

Fair Warehouse Sales

Cincinnati, July 28.—Warehouse business is holding steady and sales have continued fair during the past week. Contracts are slightly heavier than during the first part of the month and will average a little in excess for July when compared with June. Steel hoops have dropped to 1.80c, Cincinnati, but this price is not expected to hold long, as several dealers are making concessions only to rid themselves of the surplus of stock. The settlement of the local carpenters' strike is expected to bring about a better demand for building materials, although orders have been heavier for this line than any others all summer. No changes in quotations are reported.

Heavy Stocks of Scrap

In the Cleveland District—Dullness in Nearly All Parts of the Country

Cleveland, July 29.—Stocks of iron and steel scrap held in dealers' yards and by consumers are said to total at least 100,000 tons in the Cleveland district. Some authorities say this breaks all records in the history of the Cleveland scrap business. These supplies are being added to constantly from out-of-town sources and will have a dragging influence on the market when an up-turn in prices eventually comes. Dullness and heaviness continue to characterize the scrap market with trading at about the minimum. Heavy steel scrap continues quotable at about $10 to $10.50.

Some Trading Evident

Chicago, July 28.—Although no decided movement in scrap has taken place, brokers are dealing to some extent and many are taking on tonnage, believing present prices will give them a profit shortly. The long interest in the market is being increased considerably and this factor has had some effect in stiffening prices that were weak previously and has caused slight advances in a few items. Consumers of scrap are not buying in materially larger quantities and the real market is showing comparatively little activity. Railroads are offering about 20,000 tons for early closing as follows: Baltimore & Ohio, 13,000 tons; Great Northern, 2,600 tons; Rock Island, 2,900 tons; Chicago & Alton, 230 tons, and the Grand Trunk, 800 tons.

Better Feeling Prevails

St. Louis, July 28.—No new scrap lists are out in the St. Louis market, and prices are unchanged. There is a much better feeling among dealers, however, and the next couple of weeks is expected to bring some good orders.

Cincinnati Market Lifeless

Cincinnati, July 28.—Demand in the iron and steel scrap market remains at a minimum and dealers are constantly offering concessions to induce buying, without any apparent success. The larger users in this territory are well supplied and have notified dealers to suspend shipments, as they will not need new requirements for some time. Smaller users, such as local foundries, are barely operating and are not using enough material to add any hope to the market. Prices are unchanged from the general level that has held for several weeks.

Still Sluggish

Pittsburgh, July 28.—The iron and steel scrap market at Pittsburgh, like that for coke and pig iron, continues to drag along at a slow, monotonous gait, offering little or nothing of interest. The Pennsylvania railroad has issued its monthly list, offering material at its various shops in this and adjacent territories. Prices have not been tested, and quotations on all grades are nominal.

Steel Weakens at Philadelphia.

Philadelphia, July 27.—A further decline in heavy melting steel especially and a continued stagnation of No. 1 railroad wrought are the two most conspicuous points to the eastern Pennsylvania scrap market. The week's developments indicate that heavy steel is close to a square level of $10, delivered, which is the best the mills will offer. One buyer of a lot of 500 tons is understood to have

(*For complete prices see page* 224.)

shaded this figure. Brokers who have been buying against old orders now rapidly being filled have dropped their offers to $10.25, delivered, though one sale to them at $10.35, delivered, is noted. A large eastern steel works, which usually is not a buyer of steel, is in the market for a nominal tonnage. No. 1 railroad wrought is very slow and soft. Wrought pipe is firm as quoted, and sales of some heavy cast at $12, delivered, are reported. Though there appears to be a little better inquiry, buying generally has not increased. A lot of 3,000 tons of Cuban railroad, sugar plantation and yard scrap, which was arranged for several months ago, has reached this part and is being put in storage.

Tone Stronger at Buffalo

Buffalo, July 28.—Dealers in the Buffalo district report a more active demand for turnings, borings and heavy melting steel. They feel that the situation is improving in practically all of the lines. Increased demand for old car wheels has caused an advance in the price. Where concession figures had been obtainable, the schedule is now firmly held at $10.75 to $11.25.

Larger Shape Tonnage

Is Being Placed in East—Contract for Two Blast Furnaces Awarded at Cleveland

New York, July 28.—A more liberal attitude of the banks and insurance companies towards making loans on such propositions, continues to bring on the market in this city a larger tonnage of structural steel for apartment houses, loft buildings, and similar structures. Probably 10,000 tons of such work now is pending and awards in this line the past week have been more numerous. The engineers and architects have become more active in working up plans for other projects to be offered later. Plans for the large Chesapeake & Ohio railroad bridge project over the Ohio river, again have been put out by New York engineers. Eastern mills continue to draw a better tonnage of specifications from the metropolitan district. Prices practically are unchanged. While some of the larger mills in the middle west are quoting 1.31c, New York, or 1.15c, Pittsburgh, 1.26c, delivered, still may be done freely with eastern producers.

Better Gain With Eastern Mills

Philadelphia, July 27.—The gain in tonnage going to eastern mills from Philadelphia and southeastern territory is a little more noticeable. Some mills are doing considerably better than June, others only slightly. The market, however, more clearly offers an augmented tonnage, most of which is from new projects recently closed, as orders for the replenishment of stocks are coming through slowly. A 5,000-ton power house contract in this city was included in the week's awards. While several of the larger mills are quoting 1.30c, Philadelphia, or 1.15c, Pittsburgh, and appear to be standing firm, this price has not been adopted by nearby mills, and on specific lots of size 1.25c, Philadelphia, or 1.10c, Pittsburgh, is readily available.

Bottom Reached

Buffalo, July 28.—Buyers seem to realize that the bottom has been reached with the passing of the 1.10c base price and a fair volume of business is coming out at 1.15c, base, for third quarter needs. One interest reports that it is refusing to contract for shapes and plates beyond three months' delivery and that offers of business at 1.15c beyond that date have been refused by the mills. No tonnage has been reported placed in the Buffalo territory in the past week at less than 1.15c although it is understood that several of the smaller eastern mills have taken some orders at 1.10c.

Several Contracts Placed

Pittsburgh, July 28.—Although fabricators do not yet regard the situation as satisfactory, several rather attractive tonnages have been placed in this district this week, including an order for 7,000 tons of punched channels for the Illinois Central railroad, placed with the Jones & Laughlin Steel Co. This contract was briefly mentioned by THE IRON TRADE REVIEW a week ago. Structural shapes are being held at 1.15c by makers in this district, but new sales have involved very little tonnage.

Herman Laub, Pittsburgh, was awarded the contract for the new Belpre bridge across the Ohio river at Parkersburg, W. Va., by the Parkersburg-Ohio Bridge Co., at a bid of $430,000. Work must be finished Dec. 22, 1915, when it will become a link in a Pittsburgh-Cincinnati trolley system.

Blast Furnace Contracts

Cleveland, July 28.—The most important contract awarded in the Cleveland district during the past week was for the erection of blast furnaces No. 3 and No. 4 by Corrigan, McKinney & Co. to the Variety Iron & Steel Works Co. About 3,500 tons of steel will be required for the stacks and stoves. Other contracts in connection with the building of the furnaces will be awarded later. Work is already started on the foundations.

The contracts for shapes and reinforcing bars for the Bingham warehouse have not been awarded by the Crowell-Lundoff-Little Co., as that company is awaiting approval of its revised plans by the city building inspector. About 1,600 tons of shapes, largely Bethlehem sections, will be required.

Nine bids were received for the general contract for the Brooklyn-Brighton bridge, which will require about 1,200 tons of reinforcing bars. Bids were as follows: National Foundation & Engineering Co., New York, $656,922; Duquesne Construction Co., Pittsburgh, $589,446.80; R. T. McCourt, Akron, $438,811.50; Bates & Rogers Construction Co., Chicago, $549,017; Graff Construction Co., Seattle, $558,185; J. Connelly Construction Co., Cleveland, $621,193.50; King Bridge Co., Cleveland, $629,734; Carland & Hecker, Cleveland, $648,734; Charles Fath & Co., Cleveland, $579,345.50. Mr. McCourt, whose bid was $112,000 less than the cost estimated by the county engineer, stated that he had made errors in estimating and asked for permission to withdraw his bid. Upon advice of the legal advisor of the county commissioners, it is probable that the $10,000 check deposited by Mr. McCourt will be forfeited and the contract awarded to the Bates & Rogers Construction Co., Chicago.

Small Tonnage the Rule

Chicago, July 28.—One effect of the recent withdrawal of quotations on structural shapes below 1.33c, Chicago, was to uncover a considerable tonnage of business being figured on by fabricators and contractors of which the steel mills had known nothing. Not less than 10,000 tons of this hidden business immediately came to light as bidders hastened to learn their fate at the hands of the steel mills. One large project, a bridge for the Burlington railroad, had been protected by bidders, as the tonnage was too large to trust to chance, but

(*For complete prices see page* 224.)

in most other cases no assistance will be given by the mills.

Recent structural projects placed in western territory are for small tonnages and are largely railroad work.

CONTRACTS AWARDED.

Two blast furnaces for Corrigan, McKinney & Co., Cleveland, awarded the Variety Iron & Steel Works Co., 3,500 tons.

American Enameling Co.'s plant, Massillon, O., 1,500 tons, awarded by the Massillon Bridge & Structural Co., general contractor, to the Jones & Laughlin Steel Co.

Detroit-Superior bridge, Cleveland, temporary arches, about 1,500 tons, sublet by the Hunkin-Conkey Construction Co. to the McMyler Interstate Co. Carnegie steel will be used.

Ten steel dump scows, government river work, at Cincinnati, 800 tons, awarded the American Bridge Co.

New plant for Gem Mfg. Co., North Side, Pittsburgh, 150 tons, awarded W. N. Kratzer & Co.

Tobacco warehouse for R. J. Reynolds Tobacco Co., Winston-Salem, N. C., 1,200 tons, awarded Jones & Laughlin Steel Co.

Public school building, Salem, O., 150 tons, awarded Jones & Laughlin Steel Co.

Foundry building for Pittsburgh Foundry & Machine Co., Pittsburgh, 150 tons, awarded McClintic-Marshall Co.

Richardson & Boynton Co., Dover, N. J., rebuilding plant destroyed by fire; Lackawanna Bridge Co., Buffalo, contract, 1,500 tons, structural steel.

American Locomotive Co.'s plant addition at Richmond, Va.; Lackawanna Bridge Co., Buffalo, contract, 600 to 700 tons structural.

United Natural Gas Co.'s office building, Oil City, Pa., contract to Buffalo Structural Steel Co., 100 tons structural.

Highway bridge over Lehigh Valley railroad tracks, for city of Perth Amboy, N. J., 400 tons, awarded independent fabricator.

Shop building for American Locomotive Co., Richmond, Va., 550 tons, awarded Lackawanna Bridge Co.

Additional buildings for Amherst College, Amherst, Mass., 450 tons, awarded Levering & Gerrigues.

Brooklyn Hospital, Brooklyn, 700 to 800 tons, awarded Geo. A. Just.

Schwartzler apartment, 160th street and Colonial Parkway, New York City, 700 tons, awarded Hedden Iron Construction Co.

Most Holy Rosary Church and parish, Syracuse, N. Y., 250 tons, awarded Smith & Caffrey.

Building for First National Bank, Durham, N. C., 300 tons, awarded Barber & Ross.

Conveying bridge for Delaware, Lackawanna & Western railroad, 200 tons, awarded independent fabricator.

Bridge work for the Baltimore & Ohio railroad, 400 tons, awarded Mount Vernon Bridge Co.

Addition to the plant of the Phillips Insulated Wire Co., Providence, R. I., 600 tons, awarded Jones & Laughlin Steel Co.

Power house, Philadelphia, for Philadelphia Electric Co., 5,000 tons, awarded to Levering & Gerrigues.

Bridge for Pennsylvania railroad at York Haven, Pa., 450 tons, awarded to the Pennsylvania Steel Co.

Paducah & Illinois R. R. Co., miscellaneous material for Metropolis bridge, 587 tons, to Chicago Bridge & Iron Co. 180 tons.

Texas City Transportation Co., cotton warehouse, Texas City, Tex., 466 tons, to the Houston Structural Steel Co.

Anaconda Copper Mining Co., oil tanks, Miami, Ariz., 287 tons, to Riter-Conley Mfg. Co.

Three apartments for Edward W. Browning at Seventy-second and Seventy-third streets, New York City, 800 tons, awarded National Bridge Co.

Building for Brooklyn Trust Co., Brooklyn, 500 tons, steel erection awarded Post & McCord and fabrication will be done by American Bridge Co.

Bert Schlessinger, office building about 80 x 100 feet, San Francisco, Cal., 275 tons, to Ralston Iron Works.

CONTRACTS PENDING.

Bridge for the Chesapeake & Ohio railroad, across the Ohio river at Sciotoville, O., 15,000 to 20,000 tons; revised plans now issued for bids, July 31. Original plans for this bridge were withdrawn and the site changed.

Three apartments for Bing & Bing, New York City, 2,000 tons, bids now being taken.

Apartment house for Klein & Jackson, Eighty-eighth street and Riverside drive, New York City, about 600 tons, bids being taken.

Horatio apartment house, Fifty-fourth street and Park avenue, New York City, 600 tons, bids being taken.

Wheelock loft building, 38 East Thirty-third street, New York City, 1,200 tons, bids being taken.

School, West Hoboken, N. J., 300 tons, bids being taken.

Building at 22 Clinton street, Newark, N. J., 700 tons, bids being taken.

Sewage disposal plant, Akron, O., 310 tons reinforcing bars, bids to be received up to Aug. 10.

Proposed addition to the Hippodrome building, Cleveland, three stories, 500 tons.

Highway bridge across Susquehanna river at Wyoming, Pa., 1,500 to 2,000 tons. Bids to be received Aug. 11.

Hamilton County court house, Cincinnati, 3,000 to 4,000 tons. Plans issued for bids by the architects, Rankin, Kellogg & Crane, of Philadelphia.

Bridge at Bellaire road, Baltimore, for Baltimore & Ohio railroad, 250 tons. Bids being taken.

Warehouse at Broad and Race streets, Philadelphia, 300 tons. Bids being taken.

Addition to Hotel Traymore, Atlantic City, concrete design finally adopted; column cores and base girders reduced to 600 tons, but not yet awarded.

Big Bridge Contract

Goes to the American Bridge Co.—Ordering of Cars is Heavier

New York, July 29. (By wire.)—The American Bridge Co. has been awarded by the Burlington railroad the large Metropolis bridge across the Ohio, requiring 18,000 tons of steel. The bridge will connect Metropolis, Ill., and Paducah, Ky.

Buying Cars More Freely

New York, July 28.—Car orders placed during the past week have been heavier, totaling 3,500 to 4,000. The roads placing these contracts were more numerous, giving the equipment market a more active appearance. Among the roads buying were the Chicago & Great Western, the Southern Pacific, the New York Central, the Soo line, the Chicago & Indiana, and others. The Minneapolis & St. Louis is reported to be in the market for 1,000 cars and other pending inquiries reach about 8,000, the largest of which, 4,600, for the Southern Pacific, will be placed before many days.

Municipal Railway Order

The Municipal Railways Co., New York City, has placed 4,100 tons of 100-pound running rails, with the Bethlehem Steel Co., and now is in the market for 15,000 tons of contact or conductor rails. The Interboro Rapid Transit Co. continues to negotiate for 2,600 tons of contact rails. Inquiry for rails for Russia has been revived in this country the past week, one lot of 5,000 tons now being active. Another inquiry for 16,000 tons of rails for export is pending, and an old inquiry for about 10,000 tons for Chile still is up. Scattered domestic orders the past week reach about 12,000 tons.

Some large orders for track supplies are being placed by the railroads, these coming in connection with recent rail orders recently placed. The Pennsylvania railroad has given the Pennsylvania Steel Co. 30,000 pairs of splice bars and about 215,000 of special track bolts. Other important orders are being placed. The Norfolk & Western has ordered 2,000 kegs of spikes. Standard spike prices are weak and less than 1.40c, Pittsburgh, recently has been done. A liberal buying of track material and special work is reported both by the Steel Corporation and independents.

CAR AND LOCOMOTIVE ORDERS.

The Chicago Great Western has placed 500 box cars with the American Car & Foundry Co.

The Chicago & Indiana railroad has ordered 250 box cars additional from Haskell & Barker Car Co.

The Southern Pacific has ordered 40 coaches from the Pullman Co.

The Delaware, Lackawanna & Western railroad has placed 110 coaches with the Pullman Co.

The New York Central system has ordered 500 box cars from Haskell & Barker Car Co., and 500 box cars of another builder.

The Minneapolis, St Paul & Sault Ste. Marie has awarded 1,500 box cars for the Pullman Co.

The Mobile & Ohio railroad has ordered one superheater consolidation freight locomotive from the American Locomotive Co.

Punched channels for reinforcing and repairing cars for Illinois Central railroad, 7,000 tons, awarded Jones & Laughlin Steel Co.

(*For complete prices see page* 224.)

MEN OF THE IRON TRADE

Who they are Where they are What they are doing

S. T. Wellman, Cleveland, has gone to Maine to spend the next two months in camping.

W. L. Byers, general manager of sales of the Producers' Coke Co., Uniontown, Pa., is spending a several weeks' vacation at Battle Creek, Mich.

C. A. Buck, vice president of the Bethlehem Steel Co., has gone to Chile to look after the iron ore properties of his company in that country.

Ernest M. Sprague, contracting manager of the Cleveland office of the American Bridge Co., has gone to Lake Harbor, Mich., with his family for a month's vacation.

William Weinstein, formerly with the William Weinstein Iron Co., announces he now is connected with the Consolidated Rail & Iron Co., 1012 Hartford building, Chicago.

Alba B. Johnson, president of the Baldwin Locomotive Works, has been elected a director of the class B group for the reserve bank in Philadelphia district under the new currency system.

L. H. Shoemaker has been appointed division engineer for the American Bridge Co. at Pittsburgh, to succeed Richard Khuen Jr., who has been transferred to the erecting department.

F. H. Emerson has been appointed district manager of the new branch office which has been established in Boston by the Bristol Co., Waterbury, Conn. The branch office will be in the Old South building.

Alexander Johnson, chief engineer of the Department of Bridges of New York City, has resigned because of ill health and Austin L. Bowman, a consulting engineer of the department, has been named as his successor.

Walter J. Bothwell, formerly assistant general manager of sales of the Union Drawn Steel Co., Beaver Falls, Pa., has been appointed district sales manager of a new office recently opened by that company in the Dime Bank building, Detroit.

Chas. C. Worthington, formerly president of the Worthington Steam Pump Works, Harrison, N. J., now a part of the International Steam Pump Co., has offered 8,000 acres of mountain land to the state of New Jersey as a game preserve.

Colonel H. G. Prout, president of the Union Switch & Signal Co., one of the Westinghouse interests in the Pittsburgh district, has retired. W. D. Uptegraff, vice president and one of the directors of the George Westinghouse estate, was elected president. James H. Johnston, who resigned as secretary and treasurer some time ago, has been succeeded by T. W. Sieman.

H. F. Devens, who was recently elected a member of the American Iron and Steel Institute, was born in Boston in 1867 and was educated in the common and high schools of that city. From 1885 to 1890 he was

H. F. DEVENS

New Member American Iron and Steel Institute.

engaged in the cattle and sheep industry in Colorado. From the spring of 1890 until 1900 he was associated with the Yale & Towne Mfg. Co., Stamford, Conn. From 1900 to 1901 he was secretary of the National Metal Trades Association. From 1901 to 1906 he was purchasing agent of the National Cash Register Co., Dayton, O. In 1906 he became associated with the Superior Steel Co., Carnegie, Pa., of which he is now general manager of sales.

Benjamin F. Mullen, inventor of the Mullen gas washer, in general use on Bessemer stacks, has resigned as general superintendent of the Leetonia, O., and West Middlesex furnaces of the United Iron & Steel Co., having been identified with M. A. Hanna & Co. furnace interests for 12 years. Mr. Mullen began his career in the chemist's office at the Hannah stack of the Republic Iron & Steel Co., Youngstown.

Dwight E. Woodbridge, Duluth, has been chosen chairman of a newly created sub-committee on iron ores of the iron and steel committee of the American Institute of Mining Engineers. Other members of the committee are as follows: John Birkinbine, Philadelphia; E. F. Burchard, United States Geological Survey; William Kelly, Vulcan, Mich.; Charles F. Rand and F. A. Vogel, New York City; B. W. Vallat, Detroit.

Isaac M. Scott, president of the Wheeling Sheet & Tin Plate Co., which has a 10-mill plant at Yorkville, O., has been elected president of the Wheeling Steel & Iron Co., Wheeling, which recently took over the former company, and C. R. Hubbard, formerly president of the Wheeling concern, has been elected chairman of the board of directors, consisting of 13 members. The election of both Mr. Scott and Mr. Hubbard was strongly predicted when talk of the consolidation first was heard. Mr. Scott was formerly president of La Belle Iron Works, Steubenville, O.

Charles R. Crane, president of Crane Co., Chicago, is to retire within the next two weeks from active management of the business and will be succeeded by his younger brother, R. T. Crane Jr. The former will devote his time to private pursuits and to carrying out the benefactions of their father, Richard T. Crane. The sudden death of the elder Mr. Crane prevented mention in his will of many philanthropic enterprises in which he had been interested, but the two sons announced they would continue them as though they had been provided for in his will. These include: $1,000,000 for a pension and disability fund for employes of Crane Co.; $1,000,000 to provide homes in the country near Chicago for widows, deserted wives and helpless children; $100,000 for the United Charities of Chicago as an endowment for the Mary Crane nursery; $25,000 for the Visiting Nurses' Association; $10,000 for endowment for the Lake Geneva Fresh Air Home. The financial interests of the two brothers will remain the same as at present.

Gigantic Network of Blackmail in Chicago

Disclosed by Testimony of Many Manufacturers—Special Federal Grand Jury Begins Investigation —Killing of Union Grafter by a Contractor Comes as Climax of Unlawful Acts

Chicago, July 28.—With evidence indicating a widespread conspiracy to blackmail builders and makers of machinery and other materials, the effect of which has been to boycott many manufacturers who operate open shop and to interfere with the transportation in interstate commerce of such materials, United States Attorney Wilkerson is seeking indictments of various business agents of labor unions in this city before a special federal grand jury.

The case promises in some respects to parallel the dynamite conspiracy cases at Indianapolis a few years ago, and the angle through which indictments and convictions will be asked is interference with transportation in interstate commerce. State laws do not seem to offer sufficient remedy for the blackmailing offenses, but strikes called in order to force payment of graft to business agents have interfered with delivery of shipments from other states, union workmen being forbidden to unload machinery and material from cars.

The operation of the business agents is simple. On some pretext, a strike is called and the builder is invited to "kick in" with $50 to $5,000 or even more, to settle matters. Refusal led to continuance of the strike and in cases where work has been completed a "wrecking crew" visited the structure and destroyed much property.

The last straw which led to action against this form of blackmail was the killing of a business agent named George Hammond, acting for the Excavators' Graders' and Asphalt Teamsters' Union, of Chicago, by Patrick Dignan, a contractor who had been bled until he was goaded to commit this crime to save himself.

The lid was jarred loose by this killing and John J. McLaughlin, a state representative and president of the McLaughlin Building Material Co., who had suffered many impositions and had paid considerable sums to settle strikes, came forward and accused several business agents with having blackmailed him and other contractors. Mr. McLaughlin offers checks and other evidence and brings in other contractors whose evidence is being taken by the grand jury.

Mr. McLaughlin names the following, who, he says, have received payments from him or have demanded blackmail in the presence of witnesses:

George Hammond, business agent for the Excavators,' Graders,' and Asphalt Teamsters Union, killed by Dignan.

John Haley, real name said to be Hergitz, former convict.

Mike Norris, former convict.

Investigation brought about by Mr. McLaughlin's stand has indicated the following business agents also have been engaged in the blackmail game:

"Mike" Artery, secretary of the Machinery, Safe Movers' and Riggers' Union.

Michael J. Boyle, formerly business agent for Electrical Workers' Union No. 134.

Roy Tangney, business agent for Machinery, Safe Movers' and Riggers' Union, local No. 714.

Arrested With Marked Bills

Tangney was arrested Friday evening with $150 in marked bills in his pocket after William Marshall of Marshall Bros., teaming contractors, 7525 South Chicago avenue, had paid them to him to call off a strike because van drivers had assisted a member of the Machinery Movers' Union in unloading some boilers for the Scanlon school in South Chicago.

Attorney Wilkerson has been deluged with letters, anonymous and signed by sufferers from blackmailing operations, telling him of instances where business agents have bled builders and makers of machinery. These have been investigated and a large number of men have been subpoenaed to tell their experiences. Manufacturers in Pennsylvania, Ohio, Michigan, Minnesota, Wisconsin, Missouri, Illinois and other states have been summoned to tell what they know of conditions in Chicago through shipments of machinery and material here. Users of refrigerating machinery seem to have been injured most, the activity of "Mike" Artery apparently having been great.

S. Freeman & Sons, Racine, Wis., operate an open shop, union and non-union workmen being employed without regard to their affiliation. It is alleged Artery offered to this firm a virtual insurance against interference with their product in Chicago for three years on payment of $2,000. After several interviews, he was offered $1,200 and refused. Men from Racine then were brought here to unload boilers for the Viviano Bros. Macaroni Co., which

were being held up by Artery. Charles Freeman, Racine, president of the company, and A. J. Popham of Chicago, manager of the agency here, have told their stories to Mr. Wilkerson.

W. N. Gibbons, owner of an office building at 20 East Jackson street, Chicago, paid Michael J. Boyle, business agent for Electrical Workers' Union, local No. 134, a forced gift of $1,000 before his building could be completed and wired. Payment is said to have been made in the Chicago Athletic Club rooms and to have been seen by two witnesses. Mr. Gibbons is in Europe now, but his testimony will be obtained on his return.

Artery held up work on the plant of the Ravenswood Ice Co., Chicago, in April, demanding $1,000 from George B. Bright, general manager of the Huetteman & Cramer Co., Detroit, before he would allow that concern's machinery to be unloaded from cars to be installed in the ice company's plant. Mr. Bright refused to pay, but Daniel Boyle, owner of the concern, desiring his plant to be completed in time for the summer ice season, "came across" and work proceeded.

Mr. Bright has told his story to Mr. Wilkerson and incidentally furnished the names of several other Chicago concerns mulcted in the same way. These are being followed up in the search for cumulative evidence.

Absolutely Shut Out.

Walter Gordon Merritt, counsel for the American Anti-Boycott Association, has had some interesting evidence for the United States attorney and has made a statement of conditions as he has found them in this matter. He says many eastern makers of electrical material have found their materials absolutely shut out of Chicago until graft and blackmail has been paid to business agents. The product of open shops cannot be sold here otherwise. If no union shop can be found from which goods can be obtained, work is held up until some maker will unionize his works and then he has a virtual monopoly in that line. These goods are forced on the builder and the manufacturer who recognizes the unions look to them to protect him against open shop goods being used in competition. Agreements to this end are entered into, he says, and open shop goods are excluded. If a builder attempts to use open shop goods, a strike is called and money must be paid to the business agent to square matters.

As a result of the investigation, union labor has started to cleanse itself. The Building Trades Council has expelled Upholsterers' Union No. 111 because the local refused to oust two business agents who had been accused of blackmailing tactics. The vote was unanimous for expulsion of the union. It is charged the local did not oust the business agents because the latter packed the meeting with sluggers and intimidated the members who might have acted on the evidence furnished by the central body.

Flagrant Abuse of Power.

A number of other business agents have been named circumstantially as having followed the same plans as those mentioned above.

The abuse of power gained by these agents over the workmen in the several organizations in the building trades became so flagrant and such a matter of course that contractors found they must include in their bids a percentage to cover the demands which in all probability would be made on some pretext or other while construction was going on. It is claimed, without definite evidence, that the construction of a new office building just completed in Chicago this year was brought about only after payments aggregating $500,000 had been made in the form of blackmail graft to business agents.

No matter was too small to be looked after and a small store keeper who had some small matter looked after by a non-union worker was likely to find his windows smashed if he refused payment of some sum, often as low as $50. The hardship of this is that the plate glass companies were unwilling to replace the glass until the matter had been adjusted by the business agent. The position of the glass companies was a direct aid to the business agent, although it was an unwilling position on the part of the former. Glass setters are strongly organized and orders to set glass under such circumstances would result in further strikes.

The days of Sam Parks, notorious in New York some years ago, are recalled, and even worse conditions than those attributed to him have been uncovered.

Building trades have furnished the most fertile field for the operations of this form of blackmail. This has involved also the makers of equipment and several instances are adduced where tanks and other material against which an allegation of unfairness was laid have been installed only after payments have been made by the maker or the buyer, the payment of cash to a business agent apparently taking off the stigma of unfairness.

The money paid to individuals for settling strikes apparently has not been devoted to the benefit of the labor organizations but rather has gone to the benefit of the individuals. Michael J. Boyle, formerly business agent for Electrical Workers' Union, Local No. 134, Chicago, has drawn a salary of $50 per week from that organization. He is classed as a "good spender," but in the few years he has been in this city he has amassed a fortune estimated conservatively at $350,000, owning a number of flat buildings. In fact, his real estate holdings became so large he resigned his position with the union some time ago and devotes his entire time to looking after his property.

Those conversant with the detail of the grand jury investigation assert there is plenty of evidence to bring about indictments and convictions. Mr. Wilkerson, for the government, is proceeding conservatively and much evidence is being submitted to him in an effort to bring about cessation of the intolerable conditions that have obtained in the past.

Instances without number are presented in the *Herald* of this city, naming persons, dates and sums, uncovering the gigantic network of blackmail that has covered building operations in this city and imposed burdens on every line of work.

Features of Union Blackmail Situation

Business agent shot dead by contractor who was goaded to desperation by blackmailing.

Upholsterers' union expelled by Building Trades Council for refusal to oust proven grafters.

Boycott on open shop goods charged by official of anti-boycott association.

Business agent arrested with $150 in marked bills just paid him by victim.

Manufacturers of machinery and material in seven states subpoenaed to tell of experiences with blackmailers in Chicago.

Business agent offered to sell protection for term of years, allowing open shop goods to be used here.

Allegations made that shops recognizing union had agreements with union to boycott all open shop goods, giving former a monopoly.

The Otis Elevator Co. has announced its amalgamation in England with R. Waygood & Co., London, the combine to be registered in England as Waygood-Otis, Ltd. The new company will enlarge and modernize the Waygood plant in London, and will be entitled to exclusive use throughout the British Empire, except Canada, of patents and designs of the Otis Elevator Co.

Hasn't Worked in Practice

John D. Hibbard, commissioner of the National Metal Trades Association, was the last witness examined by the United States Commission on Industrial Relations at Chicago last Saturday.

He said:

"Smoothing out of the practical difficulties of collective bargaining is the greatest need of the world today. The unions have helped the workingmen immensely and they have come to stay. The theory of collective bargaining is good, but it hasn't worked out in practice. To make it work is the industrial world's problem."

He believes the unions lack responsibility and should have some sort of governmental control. The experience of his clients, he said, was that the closed shop resulted in a limited output and higher cost, which is paid by the public. Peaceful picketing, he said, is an impossibility, and violence always results from the workers' actions and not the employers'.

Greatest Need of the World Today

Stated by Commissioner Hibbard at Government Investigation of Industrial Relations—

Interesting Points Developed at Chicago Sessions

Chicago, July 25.—Definite tendencies were developed by the questions asked of witnesses before the United States Commission on Industrial Relations in session here this week. Though interrogations vary with the several witnesses, the opinion is asked of each relative to a national body charged with settlement of various questions arising between employers and organized labor. The desire is evident to gather the opinions of both sides as to the probable value of a national commission before which such matters could be taken for adjustment.

Opinions have varied, but the usual expression, by representatives of organized labor and of employers' associations as well, is that matters of this kind in dispute usually are too local for such treatment and local conditions differ too radically to allow rules to be laid down to fit every locality.

Opinions Vary Widely

The hearings closed today after examination of nearly 30 representatives of organized labor, employers' associations of various kinds and civic bodies. Opinions from so many sources varied widely as representing experience gained through varying circumstances. Yet, on the other hand, agreement was found in many cases when least expected as employer and employe recognized the evil of present conditions and had reasoned the same remedy would aid in bettering matters.

From here the commission goes to the Pacific coast, with stops in several centers, and on its return in the fall will hold a further hearing in Chicago, going into matters more in detail.

National associations of employers have taken an interest in the hearings and are represented by counsel to assist in bringing out points of value to the commission in determining its findings. Walter Drew, commissioner for the National Erectors' Association, is representing the National Metal Trades Association, the National Founders' Association, the National Association of Manufacturers, the National Council for Industrial Defense and the National Erectors' Association. It is his aim to aid in bringing out evidence that will clear the situation and give the commission a correct idea of conditions as seen by these organizations.

That industrial unrest exists in this country in an acute stage is taken for granted by the commission and this has not been denied by any one examined here. As to the causes, there were as many opinions as witnesses, but remedies were not always forthcoming.

Collective bargaining between workers and employes has been inquired into deeply and a variety of opinions has been developed. In a single day, the five varying statements presented elsewhere were developed under questioning along this line.

Agree on Mining Remedy.

Agreement as to conditions and remedies in the Illinois coal field was found when Edward T. Bent, of the Illinois Coal Operators' Association, and Duncan McDonald, secretary of the Illinois Mine Workers were heard. The gist of their evidence was that too many mines are in operation and too much equipment is being used in the Illinois field in proportion to the coal needed by consumers. Of the 80,000 miners employed in this trade at least 20,000 are idle all the time and 40,000 are idle most of the time. Mines operate 150 to 170 days a year and the miner on good daily wages thus has a small annual earning power, about $500, whereas the government has found $700 is the minimum on which a family can live in comfort and decency.

Mr. Bent and Mr. McDonald agreed a government commission to forbid opening of more mines than necessity demands would solve much of the difficulty that now presents itself.

Coercion is Alleged

Dudley Taylor, counsel for the Chicago Employers' Association, declared trades unions exist on a basis of coercion. Many members, he said, are there unwillingly and are afraid

(*Continued on page* 217.)

Chicago Hearings of Great Value

Frank P. Walsh, chairman United States Commission on Industrial Relations, said:

"In the Chicago hearings, for the present closed, the spirit of co-operation becomes more pronounced. I do not think the same earnest desire to help the commission has been shown in any other city in which public hearings have been held.

"We hope to hear more from Chicago men and women, on our return from our western tour. Within a week or two, we expect to open an office in this city and our field work will be directed largely from here. This city will be made a center for public hearings and witnesses from surrounding cities and states will be brought here to present their views."

New Prices

On Wire Products Bring Out Heavy Specifications

Cleveland, July 28.—In the Cleveland district, the effect of the recent advance in prices has been to bring out a large volume of specifications and some new business, including a contract for 1,500 tons of wire at the new quotation of 1.35c, Pittsburgh, has been done.

One Lined Up Late

Pittsburgh, July 28.—All manufacturers of wire products in this district boosted prices to the basis of $1.35 for plain wire and $1.55 for nails last week, although one interest did not line up quotations until Thursday. There has not been any new business of consequence since the advance, but specifications are coming out in good volume. General wire mill operations are estimated at from between 65 and 70 per cent of capacity.

Specifications Are Heavier

Chicago, July 28.—Specifications by users of wire and wire products are coming in greater volume since the recent advance in prices, and it is apparent those who have tonnage on the books of wire makers believe it wisdom to take it before a further advance is registered. As usual in the case of an advance, new business is not large, but the mills are being kept busy on business already contracted.

Pipe Contract

Involving Seven Thousand Tons Awarded The National Tube Co.

Pittsburgh, July 28.—Booth & Flynn, Ltd., this city, who have the general contract for a 54-mile gas line in Arkansas, have awarded the contract for steel pipe to the National Tube Co. The undertaking calls for 16-inch pipe and will involve about 7,000 tons. The S. R. Dresser Mfg. Co., Bradford, Pa., will furnish couplings. Booth & Flynn also have placed orders for about 1,100 tons of miscellaneous sizes for East River tube work at New York. We also note an order for 12 miles of 10-inch steel pipe, involving 800 tons, for Pennsylvania shipment, and an order for 500 tons has been placed by a Huntington, W. Va., gas interest. Inquiries involve 50 miles of 10-inch and 50 miles of 16-inch steel pipe, and a number of tentative inquiries are pending. Boiler tubes continue quiet and are somewhat irregular.

Closes Pipe Tonnage

New York, July 28.—A large oil company has placed 10,000 tons of oil country goods with a leading independent maker in the middle west. This tonnage will cover the estimated requirements of this company for the last half of the current year, and will be largely for western shipment.

Better Showing

Than Was Expected is Made by the Steel Corporation

New York, July 28.—An increase of $2,463,215 over the first quarter of the present year was earned by the United States Steel Corporation during the second quarter, ended June 30. This showing was considerably better than had been expected. Most predictions of total earnings were around $19,000,000, whereas the total earnings during the second quarter were $20,457,596, compared with $17,994,381 during the first quarter. Sinking fund allowances in the second quarter were heavier, totalling $7,159,968, against $5,798,023 in the first quarter and left a net income of $13,297,628 as against $12,196,358 in the first quarter. The regular quarterly preferred and common dividends, totalling $12,658,700, were declared, leaving a deficit for the second quarter of $5,159,237, which is to be paid out of surplus. The deficit for the first quarter was $6,289,644, or $1,130,407 more, making the total for first half deficit $11,448,881. The preferred dividend of 1¾ per cent is payable Aug. 29 to holders of record Aug. 3 and the common dividend of 1¼ per cent is payable Sept. 29, to holders of record Sept. 1.

The total second quarter earnings of the Steel Corporation for the past seven years, have been as follows:

1914	$20,457,596
1913	41,219,813
1912	25,102,265
1911	28,108,520
1910	40,170,960
1909	29,340,491
1908	20,265,755

Death of W. H. Tallman

W. H. Tallman, Wheeling, W. Va., one of the pioneer iron and steel manufacturers of the Ohio valley, died at his home, July 22, aged 75 years. After serving as a lieutenant during the civil war, Mr. Tallman with other associates organized the Aetna Iron & Nut Co., in 1872. The company was reorganized in 1886 as the Aetna Iron & Steel Co., and Mr. Tallman served as president until 1893. He had also aided in organizing the Standard Iron Co., and when the Aetna and Standard companies were combined in 1893, Mr. Tallman retired from active business. John A. Topping, chairman of the Republic Iron & Steel Co., a nephew of Mr. Tallman, received his business education through his early associations with his uncle. Mr. Tallman was connected with various banking and industrial interests in the Ohio valley and during his long life did as much as any other one man to build up the steel interests in that section. He is survived by his widow.

Foreign Prices

Showing Some Advances—Higher Ocean Freights Probable

New York, July 29. (By wire.)—The effect of a widespread European war, it is expected, would be to increase exports of iron and steel by the United States, especially to such markets as are now largely supplied by Germany and Austria. A sharp rise in ocean freights undoubtedly would follow quickly. Some stiffening already is apparent. Leading iron and steel exporters of this country have been anticipating the possibility of a serious European conflict and have been covering cargoes against war risks for the past three weeks.

Some advances in British steel products have appeared, including about 10 shillings per ton in sheets and 10 cents per box in tin plate.

Larger Volume

Of New Business — Price Advances Are Approved

New York, July 29. (By wire.)—The recent advance in plates, shapes and bars has been well received by the trade and has improved the general tone of the situation.

The United States Steel Corporation continues to receive new business and specifications in better volume. Wire tonnage is especially good. July will show good increase in unfilled orders over June. The Corporation still operates at 70 per cent of ingot capacity and is expecting to put in two additional furnaces to maintain its pig iron stocks, which are low and are declining.

The American Steel & Wire Co. has purchased 3,000 tons of low phosphorus pig for Worcester.

To Help Your Business

International Engineering Congress Proceedings Will Contain Many Valuable Suggestions

THE ATTENTION of managers, superintendents, engineers and others interested in industrial progress is being drawn more and more to the program of the International Engineering Congress, which will be held in San Francisco in 1915. The subjects which will be discussed, as well as the character and reputation of the speakers, assures an event of unusual importance, and the proceedings will be replete with suggestions of value to the American manufacturer.

The interest which has been aroused in foreign countries is shown by the fact that up to the present time there have been received enrollments and subscriptions from 42 such countries. It is further noted that of the present total enrollment in the Congress, approximately 25 per cent is from countries other than the United States.

The Congress will be held under the auspices of the five great engineering societies of the United States, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, the American Institute of Mining Engineers, the American Society of Civil Engineers and the American Society of Naval Architects and Marine Engineers. Its sessions will take place during the week of Sept. 20, 1915, in the auditorium and section rooms which will be placed at its disposal by the Panama-Pacific International Exposition.

Already over 100 foreign engineering societies have accepted the joint invitation of the five American societies to participate in the congress, which insures its being truly international in character.

The subjects that will be discussed have been grouped under 10 heads, including all branches of engineering and the industrial arts. Naturally also the San Francisco Exposition will be a great attraction to the delegates to the Congress. The industrial and mechanical exhibits will be exceptionally complete and the progress that has been made up to date in the construction of the machinery palace and the palace of varied industries makes it certain that every exhibit will be in place on time.

The Lumen Bearing Co., Buffalo, has issued an attractive booklet describing "Lesoyl", a semi-fluid concentrate, containing graphite, specially prepared to insure the permanent suspension of the graphite when mixed with lubricating oil or grease. The booklet tells how this product may be used for lubricating purposes and also gives details regarding prices.

A doorway in the Palace of Varied Industries, Panama-Pacific International Exposition, one of the two smaller southern entrances to the building

SAN FRANCISCO HARBOR GLIMPSED BETWEEN THE PALACE OF MACHINERY AND THE PALACE OF VARIED INDUSTRIES, PANAMA-PACIFIC INTERNATIONAL EXPOSITION

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Machine for Shoveling Iron Ore

An Interesting Device For Loading Mine Cars In Underground Workings and From Stockpiles

ANY IMPROVEMENT tending toward a reduction in the cost of mining iron ore is of unusual importance at this time both to the mine operator and the ore consumer. This applies particularly to underground mining, for as the large open pits on the Minnesota ranges are mined out, underground methods are becoming relatively more important. Some farsighted ore producers have been giving special study recently to improvements in methods of underground mining. Some particularly important experiments are being conducted on the Mesabi range on the application of coal cutting machines to iron mining, in trying out new methods of drilling, and in testing various underground loading devices. In the latter connection, the shoveling machines which have been developed specially for underground mine work by the Myers-Whaley Co., Knoxville, Tenn., are of interest. The accompanying illustrations show these machines in operation underground under varying conditions.

FIG. 2—MACHINE OPERATING IN ALABAMA IRON ORE MINE

The Shoveling Machine

The machine consists essentially of a car carrying a motor and power transmitting mechanism, with the shovel mounted at the front end and a conveyor for carrying away the excavated material extending to the rear. The shovel is mounted on a swivel connection so that it may be swung to either side of the track. The shovel itself is driven through bevel gears and two heavy chains. It is mounted on a set of cranks and rocker arms in such a manner that the motions of a hand shovel are closely imitated.

The underground machines are built in three types, the principal differences being in the amount of head room required. One type is designed to work in a space as low as 47 inches between the top of the rail and the roof. It is said that with a shallow track and a low car, work can be done in a mine or tunnel 50 inches high with this machine. The lateral swing of the rear conveyor provides for loading the cars on the same track occupied by the machine or on a separate parallel track. This machine weighs about 9,000 pounds in working order and is designed to operate on a track 24 inches gage or over. When the gage is less than 40 inches, balance rails are used. The machine is about 21 feet in length and 65 inches in width, the wheel base being 33¾ inches. It has a reach of 7 feet 9 inches to

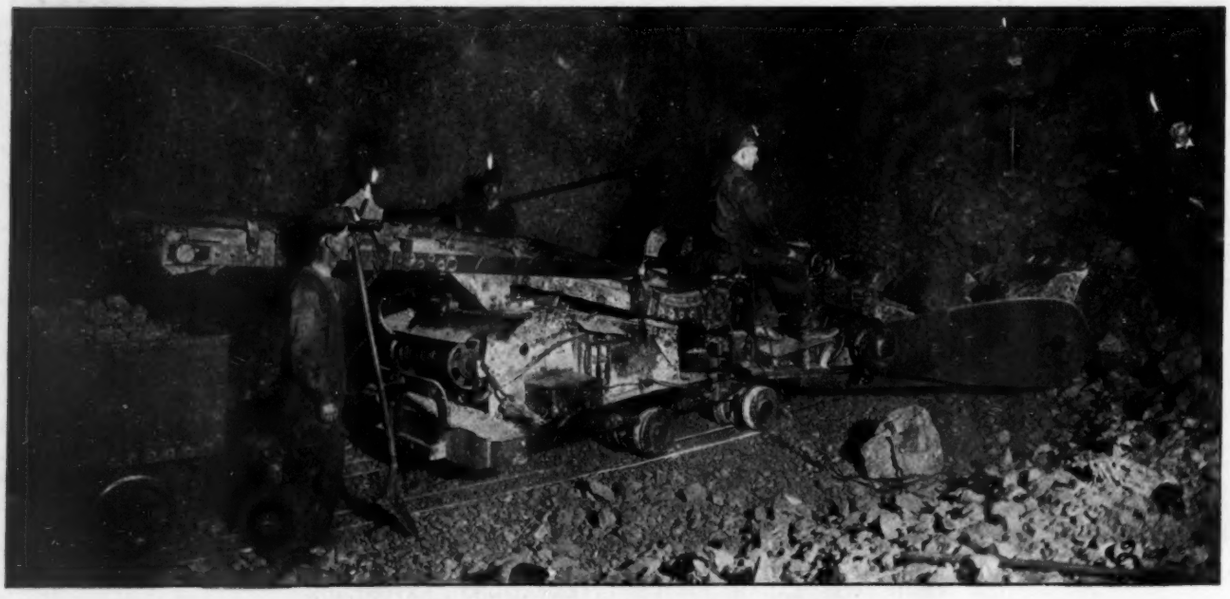


FIG. 1—SHOVELING MACHINE IN A LEAD ORE MINE

each side of the center of the track. The shovel is 27 inches wide and the machine consumes about 7½ horsepower. It is equipped with a 10-horsepower motor and it is said to have a maximum capacity of 30 cubic feet per minute. In ordinary coal mines it is claimed that this machine will load at an average rate of from 10 to 20 tons per hour.

Two larger machines are built, one being designed to work in tunnels from five to six feet high and the other in tunnels seven or more feet in height. The former machine weighs 11,000 pounds equipped with a 15-horsepower motor, while the latter weighs 17,000 pounds and is equipped with a 20-horsepower motor. In lead ore the latter machine is said to handle from 180 to 200 tons per eight hour shift. In red hematite iron ore, it is said to have averaged 40 tons per hour actual shoveling time, not including the time required to shift cars. The machines are designed so that they may be operated by compressed air instead of electricity.

A full machine crew consists of one runner and usually one man in the front to clean up and two men behind to shift the cars, a total of four men. It is said that the machine shown in Fig. 1 loaded 54,098 tons of lead ore at Black River, Mo., in fourteen months, between September and November.

Fig. 2 shows one of the shoveling machines at work in one of the Woodward Iron Co.'s mines in Alabama. This machine was operated in a pitching seam where the foot-wall pitches about 25 degrees.

The Myers-Whaley Co. has also developed a turntable machine especially adapted for stock yard work. It swings through 360 degrees and may be built for large capacities. It is designed to load coke from the oven wharves to railway cars and for other work of similar character. By using a flight conveyor the coke can be passed over a screen to remove the breeze just before discharging into the cars. The breeze can be dropped directly back on the wharf or it may be carried away by the return flights of the conveyor and discharged through an opening in the bottom of the apparatus in a car or cart following the machine.

Electricity In Modern Industry

BY CHARLES P STEINMETZ

THE use of electricity in modern civilized life is rapidly increasing: in lighting our homes, factories, streets; in industrial power application; in domestic service, from the fan motor to the electric bell or the heating and cooking device; in transportation: and while no great inroads have yet been made into the field of the steam locomotive, an entire system of electric railroads has sprung up all over the country, fully comparable in size and power demand with the steam railway system; large new industries have developed in electro-chemistry and electro-metallurgy, supplying us with materials unavailable before—as aluminum—or improving the production of other materials—as in copper refining, etc.

All these applications are uses of energy. In nearly all, electrical energy is replacing some other form of energy used heretofore: chemical energy of fuel, or mechanical energy of steam or gas engines, etc.

To understand the reasons which enable electrical energy to compete successfully with other forms of energy, which are longer and more familiarly known, we have to look into its characteristics.

Electrical energy can be transported—or, as we usually call it, transmitted—economically over practically any distance. Mechanical energy can be transmitted over a limited distance only, by belt or rope drive, by compressed air, etc.; heat energy may be carried from a central steam heating plant for some hundred feet with moderate efficiency, but there are only two forms of energy which can be transmitted over practically any distance, that is, which in the distance of transmission are limited only by the economical consideration of a source of energy nearer at hand: electrical energy, and the chemical energy of fuel. These two forms of energy thus are the only competitors whenever energy is required at a place distant from any of nature's stores of energy. Thus, when we study a problem in electric power transmission and consider whether it is more economical to transmit power electrically from the water power or the coal mine or to generate the power by a steam plant at the place of demand, both really are transmission problems; and the question is whether it is more economical to carry energy electrically over the transmission line, or to carry it chemically, as coal by the railroad train or boat, from the source of energy supply to the place of energy demand, where the energy is converted into the form required, as into mechanical energy by the electric motor or by steam boiler and engine or turbine.

Electrical energy and chemical energy both share the simplicity and economy of transmission or transportation, but electrical energy is vastly superior in the ease, simplicity, and efficiency of conversion into any other form of energy, while the conversion of the chemical energy of fuel into other forms of energy is difficult, requiring complicated plants and skilled attendants, and is so limited in efficiency as to make the chemical energy of fuel unavailable for all but very restricted uses: heating and the big, high-power steam plant. Pressing the button turns on the electric light and thereby starts conversion into radiating energy: with chemical energy as source, either special fuels are required—in the candle, kerosene lamp—or a complex gas plant. Closing the switch starts the motor, whether a small fan motor or a 1,000-horsepower motor supplying the water system of a city or driving the railroad train. With fuel as the source of energy, the boiler plant, the steam engine, or turbine, with their numerous auxiliaries, and skilled attendants, etc., are necessary, and the efficiency is low except in very large units. To appreciate the complexity of the conversion of the chemical energy of fuel, compared with the simplicity of electrical energy conversion, imagine the domestic fan motor with coal as the source of energy: a small steam engine, with boiler and furnace, attached to the fan: to start the fan, we have to make a coal fire and raise steam to drive the engine. This illustrates how utterly unavailable the chemical energy of fuel is for general energy distribution. General energy distribution, therefore, may justly be said to date from the introduction of electric power.

Equally true is the reverse: the conversion of mechanical or other energy into electrical is simple and economical, while the conversion into chemical energy is not. Hence, one of the two large sources of nature's energy, the water power, was, before the days of electrical engineering, useless except to a very limited extent, since the location of the water power is

This article, by Chas. P. Steinmetz, chief consulting engineer, General Electric Co., appeared originally in the February, 1914, issue of *The Journal of The Franklin Institute.*

rarely such that the energy could be used at its source. The water powers thus have really been made available only by the development of electrical transmission.

It is a characteristic of electrical energy that it can be concentrated to an energy density higher than any other form of energy, and results can thus be produced by it which no other form of energy can bring about, or do directly by the brute force of energy, as we may say, which formerly had to be brought about in a roundabout way.

Thus iron can be reduced from its ores by the chemical energy of coal in the blast furnace, but aluminum and calcium can not, as their chemical affinity is higher, and require the higher energy concentration available with electric power. Iron reduced in the blast furnace combines with carbon to cast iron. So calcium combines with carbon in the electric furnace to carbide, the starting material acetylene, and of cyanamid and the modern fertilizer industry. Platinum can just be melted, and quartz softened, in the hottest flames of combustion: the oxy-acetylene flame and the oxy-hydrogen flame. But in the electric arc platinum and quartz and every existing substance, even tungsten and carbon, can be melted and distilled or sublimed. Thus mighty industries have grown up and many new materials made available to man, as aluminum, silicon, calcium, chromium, the carbides, cyanamid, acetylene, etc.; others produced in a cheaper manner, as alkalies, hypochlorites, phosphorus, magnesium, sodium, etc.

Electrical Energy is Link

Electricity as such is the most useless form of energy: it is not found in nature in industrially available quantities, and finds no industrial use as electrical energy, but it is always produced from some other form of energy, and converted into some other form of energy: light, mechanical energy, chemical energy, heat, etc. That is, electrical energy is entirely the connecting link, the intermediary, by which energy is brought from the place where it is found to the place where it is used, or changed from the form in which it is found to the form in which it is used. Thus, on first sight, it appears a roundabout way, when, for instance, in modern electrical ship propulsion an electric generator is placed on the steam turbine, and a motor on the ship propeller, a few feet away, though it is not different from practically every other use of electric energy: a transmission link, superior to any other transmission by the flexibility given by the simplicity and economy of conversion.

The most serious disadvantage of electrical energy is that it cannot be stored. It is true, there exists the electric storage battery, and it is used to a large extent as a stand-by battery in high-grade electric distribution systems to give absolute reliability of service, or as a battery floating on a railway circuit to equalize fluctuations of power, or in special applications, as electric automobiles. It does not really store electrical energy, but stores energy by conversion of the electrical into chemical energy, and by reconversion, in discharge, of the chemical into electrical energy.

The economic efficiency of the storage battery—using the term in the broad sense including interest on the plant investment and depreciation—is so low that the storage battery does not come into consideration in the industrial storage of energy—that is, in making the rate of electrical energy consumption independent of that of energy production. We can best realize this by comparing electrical energy with the chemical energy of fuel: the latter can be stored with perfect economy. Thus, when using fuel as the source of energy—in a steam plant—no serious difficulty is met by the industry even if the fuel supply is interrupted for months, as in the case of a supply by water, through the closing of the navigation by ice: we would simply bring in a sufficient coal supply to last until the navigation opens again in spring. But with electrical energy from a water power we could never dream of storing energy by storage battery to last over the two or three months during which the river runs dry and the water power fails.

This means that electrical energy must be consumed at the rate at which it is produced, and the cost of electrical energy thereby becomes dependent on the rate of the energy used. This is not the case with most other forms of energy, as, for instance, the chemical energy of fuel. The price of a ton of coal, as determined by the cost of supplying it, is the same whether I dump the coal into a furnace all at once, or whether I use it up at a uniform rate in a small stove, lasting for weeks. If I consume 2,400 cubic feet of gas per day, its cost and thereby its price is the same whether I use the gas at a uniform rate throughout the day, of 100 cubic feet per hour, or whether I use the entire 2,400 cubic feet in one hour, nothing in the remaining 23 hours: the gas is produced at whatever rate is most economical, stored in the gas holders and supplied from there at whatever rate it is required for consumption. If, however, I use 240 kilowatt-hours of electrical energy per day, it makes a very great difference in the cost of supplying this energy whether I use it at a uniform rate of 10 kilowatt-hours per hour, or whether I use the entire 240-kilowatt-hours in one hour, nothing in the remaining 23 hours. In the former case, 10 kilowatts of generating machinery are necessary in the steam or hydraulic station producing the electric energy, 10 kilowatts capacity in transmission lines, transformers, substation and distribution lines, to supply the demand. In the latter case, 240 kilowatts of generating machinery, 240 kilowatts of line and transformer capacity are absorbed, and that part of the cost of supplying the electric energy, which consists of interest in investment in the plant, of depreciation, etc.—in short, the fixed cost—is 24 times as high in the latter as in the former case. If the fixed cost approximates half the total cost in a steam plant, or is by far the largest part of the total cost in a hydraulic plant, it follows that in the case of concentrated energy used during a short time the cost of electric energy —and with it the price—will be very much larger—many times, possibly—as in the case of a uniform energy consumption.

Thus, due to the absence of storage, the cost of electrical energy essentially depends on the uniformity of the rate of its use—that is, on the load factor, or the ratio of the average consumption to the maximum consumption.

"The Diversity Factor"

If I use 240 kilowatt-hours of electrical energy in one hour, nothing during the remaining 23 hours, that part of the cost which is the fixed cost of plant investment and depreciation is 24 times as great as if I used the same amount of energy at a uniform rate throughout the day. In the former case, if somebody else uses 240 kilowatt-hours, but during another hour of the day, the same plant supplies his energy, and the fixed cost thus is cut practically in two—that is, the cost of energy to both of us is materially reduced. Thus, again, the cost of electrical energy, and with it its price, depends on the overlap or not overlap of the use of the energy by different users, the so-called "diversity factor." The greater the diversity factor—that is, the less the different uses overlap and

the more their combination, therefore, increases the uniformity of the total energy demand, the "station load factor"—the lower is the energy cost. The cost of electrical energy for lighting, where all the demand comes during the same part of the day, is inherently much higher than the cost for uniform 24-hour service in chemical works, and with the increasing variety of load, with the combination of energy supply for all industrial and domestic purposes, the cost of energy decreases.

Thus, unlike other forms of energy, due to the absence of energy storage, electrical energy can have no definite cost of production, but, even supplied from the same generating station, its cost varies over a wide range, depending on the load factor of the individual use and the diversity factor of the different uses.

This feature, of necessity, must dominate the economical use of electrical energy in industrial, domestic, and transportation service.

Civilization results in the complete inter-dependence of all members of society upon each other. Among the savages each individual, family, or tribe is independent, produces everything it requires. In the barbarian state some barter develops, followed by trade and commerce with increasing civilization. But up to a fair state of civilization—up to nearly a hundred years ago—all necessities of life were still produced in the immediate neighborhood of the consumer, each group or territory still independent in its existence, and commerce dealing with such things only which were not absolutely necessary for life. All this has now changed, and in our necessities of life, as well as in our luxuries, we depend on a supply from distances of hundreds and thousands of miles: the whole world contributes in the supply of our food, clothing, building materials, etc.

That means, our existence is dependent on an efficient and reliable system of transportation and distribution of all needs of civilized life. Such has been developed during the last century in the system of steam railroads, which, in taking care of the transportation and distribution of commodities, have made modern civilization possible. Civilization means separation of production, in time and in location, from consumption, to secure maximum economy.

The necessities of civilized life consist of two groups: materials and energy. Our transportation system takes care of materials, but can not deal with the supply of energy, and the failure of an efficient energy supply has been and still is the most serious handicap which retards the advance of civilization. The transportation system could deal with the energy supply only in an indirect manner, by the supply of materials as carriers of energy, and when our railroads carry coal it is not the material which we need, but the energy which it carries. But this energy is available only to a very limited extent, as heat, and as mechanical power in big steam units; most of the energy demands of civilized life could not be satisfied by it. In any country village far away from the centers of civilization we have no difficulty to have delivered to us any material produced anywhere in the world; but even in the centers of civilization we could not get the energy to run a sewing machine or drive a fan without electric power. Thus, just as our steam railways and express companies take care of the transportation and distribution of materials, so civilization requires a system of transmission and distribution of energy, and our electric circuits are beginning to do this; and just as 50 to 75 years ago in the steam railroads, steamship lines, etc., the system of transportation and distribution of materials was developed, so we see all around us in the electric transmission systems the development of the system of the world's energy transmission in progress of development. When we see local electric distribution systems combining, the big electric systems of our capital cities reaching out over the country, transmission lines interconnecting to networks covering many thousands of square miles, this is not merely the result of the higher economy of co-operation, of mass production, but it is the same process which took place in the steam railroad world some time ago, as a necessary requirement of co-ordination to carry out their function as carriers and distributors of materials in the case of railroads, of energy in the case of the electric systems.

We must realize this progress, and the forces which lead to it, so as to understand what is going on, and to assist in the proper development, in avoiding, in the creation of the country's electrical network, whatever mistakes have been made in the development of the country's railway network.

Electricity, thus, is taking over the energy supply required by civilization as the only form of energy which, by its simplicity and economy of conversion, combined with economical transmission, is capable of supplying all the energy demands, from the smallest domestic need to the biggest powers. As we now begin to realize, the economic function of the steam engine is not the energy supply at the place of consumption, from the chemical energy of coal—it is too complicated and inefficient for this—but it is the conversion of chemical energy of coal into electrical energy in bulk, for transmission and distribution to the places of consumption.

If, then, electric power takes the place of steam power in our industries, etc., it is not merely the substitution of the electric motor for the steam engine or turbine. Such would rarely realize the best economy. The method of operation in all our industries, and especially those requiring considerable power, is largely—more than usually realized—determined by the characteristics of the power supply, and what is the most economical method with the steam engine as source of power may be very uneconomical with electric power supply, and electric power supply often permits a far more economical method of operation which was impossible with steam power. Thus the introduction of electricity as the medium of distributing the world's energy demand means a reorganization of our industrial methods, to adapt the same to the new form of power.

For instance, the steam engine requires skilled attendance, and with its boiler plant, auxiliaries, etc., is a complex apparatus, is economical only in large units. Thus, when operating a factory or mill by steam power, one large engine is used, driving by shafts and counter-shafts, by pulleys and belts, and possibly wasting half or more of its energy in the mechanical transmission to the driven machines. But we could not economically place a steam engine at every one of the hundreds of machines in the factory. Substituting electrical power by replacing the engine by one large electric motor would be very uneconomical, as we can place a motor at every driven machine, and these small motors are practically as efficient—within very few per cent—as one big motor would be, and all the belting and shafting, with its waste of energy, inconvenience, and danger, vanishes. With the steam engine as source of power, to run one or two machines only, to complete some work, requires keeping the big engine in operation, and therefore is extremely wasteful. With individual electric motors the economy is practically the same whether only one or two motors are used, or the entire factory is in operation. On the other hand, with the

(*Continued on page* 224b)

Cooling Fan

The Diamond Clamp & Flask Co., Richmond, Ind., has recently developed a fan for cooling shops and factories, which may be run from line shafting without installing any electrical apparatus. It consists simply of a pulley which carries the countershaft belt together with a friction wheel for driving the fan. The blades are of galvanized steel and the bearings are provided with hard oil cups. The friction wheel operates at 200 revolutions per minute. A simple mechanism for throwing the fan in and out of gear is provided.

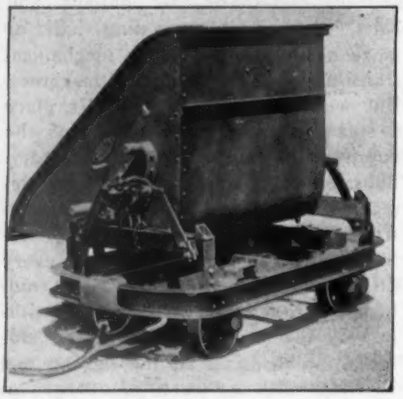
Resistance Thermometer

The Brown Instrument Co. Philadelphia, has perfected a new resistance thermometer for accurately measuring temperatures from 200 degrees below zero to 1,800 degrees Fahr. This instrument is particularly adapted for measuring low temperatures which cannot readily be measured with thermo-electric pyrometers, and is useful for measuring the temperatures found in dryers and ovens, in the bearings of machines which may overheat, in the winding of motors and in transformers, on refrigerating machines, and in rooms which must be maintained at a constant temperature.

The instrument consists of a bulb or coil of resistance wire, through which a current is passed, and which changes in resistance with change in temperature. Bulbs located at numerous points around the plant are connected by cable to the indicating instrument and switchboard, which can be placed at any desired point. In determining the temperature it is simply necessary to switch any bulb on to the indicating instrument. If a constant temperature is to be maintained, the pointer can be adjusted to this temperature and the deflection of the pointer on the upper scale of the instrument will show the increase or decrease in temperature. This new instrument operates on either dry cells, storage batteries, or 110 or 220-volt direct current lighting circuits.

BROWN RESISTANCE THERMOMETER

The chief advantage claimed for the instrument is its ability to read moderate temperatures from one central location without the necessity of going about from one point to another to read the temperature as indicated on thermometers. The bulbs in this instrument are all of metal and are not liable to be broken as is the case with a glass thermometer.



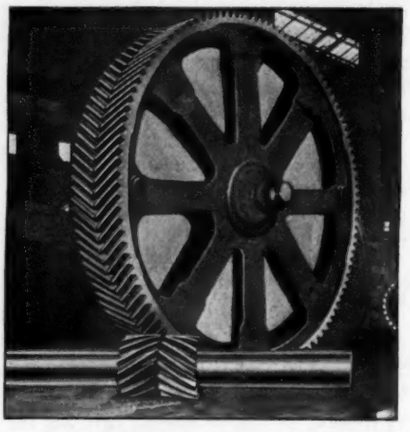
SPECIAL COAL CAR FOR BOILER ROOMS

Side Dump Coal Car

The Orenstein-Arthur Koppel Co., Koppel, Pa., has recently designed a new type of dump car for handling coal to boilers. As shown in the accompanying illustration, the car dumps only part way and remains in an inclined position, so that the coal may be easily shoveled out. When loading, the car remains in its normal upright position. When unloading, it is held in place by an adjustable calk which fits under the rockers. The car was designed for running over the floor of the boiler room and is provided with flangeless wheels and a swivel front axle.

Papers Announced

The eighth annual meeting of the Association of Iron and Steel Electrical Engineers will be held at the Statler Hotel, Cleveland, Sept. 14 to 19. The following papers will be read: "Some Electrical Problems Practically Considered", by H. G. Lamme; "Statistical Data of Electrical Application in the Iron and Steel Industry", by R. Tschentscher; "Applications of Auxiliary Apparatus in Iron and Steel Mills", by Stewart C. Coey; "Load and Use Factors as Applied to Motor Installations", by H. M. Glassman; "A Synchronous Condenser Installation for Power Factor Correction and Voltage Regulation", by W. O. Oschmann; "The Apprenticeship System as Applied to Steel Mills", by B. W. Gilson; "Cables and Accessories", by J. C. Bowman; "Underground Transmission in a Steel Plant", by F. D. Egan; "Hot Metal Cranes for Steel Mill Service", by R. J. Mullally; "The Control of Induction Motors for Rolling Mill Drive", by Wilfred Sykes and G. E. Stoltz; "Magnetic Control Characteristics", by H. F. Stratton; "A. C. and D. C. Magnetic Controllers for Auxiliary Motors", by W. O. Lum; "Switchboard and Switching for Steel Mills", by Saul Lavine; "Machine Tool Drives", by Charles Fair; "Condensers and Their Auxiliaries", by P. N. Ehrhart; "Silent Chain Power Transmission", by F. L. Morse; "Organized Safety", by L. R. Palmer; "High Candle-Power Incandescent Lamps for Steel Mill Illumination", by G. H. Stickney and A. B. O'Day; "Power Transformer Construction for Steel Mills", by G. A. Waters; "Watt-hour and Ampere-hour Meters and Their Application in Steel Mills", by R. C. Lamphier; and "The Flaming Arc Lamp in the Iron and Steel Industry", by Allen T. Baldwin.



SEVENTY TON CUT GEAR FOR SHEET MILL DRIVE

Large Cut Gear

The accompanying illustration shows a cut cast steel gear and pinion 232 inches in diameter recently built by The William Tod Co., Youngstown, Ohio. The gear weighs 70 tons and is designed for a sheet mill drive. It is one of the largest gears with machined helical teeth ever constructed.

Taylor System at Franklin Plant

Last of Three Articles Dealing With the Results of Scientific Management in an Automobile Factory

BY G D BABCOCK

(Continued from THE IRON TRADE REVIEW, July 23).

THE illustrations given in the preceding articles show effect of time study upon the workmen and the cost of product, but there is a very much more important phase of time study than this, namely the determination of the date for the different events of the elements and units in the process of manufacture and a reduction of capital investment due to the dependency of these dates.

Previously in this paper the importance of analysis of product was mentioned and the following description of the control plan rests upon this analysis.

The fundamentals of control as discussed here are: (1) Characteristics of part to be made, which includes form, material, method, place and time; (2) quantities to be produced and the date of each event in the production.

The date of the event is affected, in addition to the above, by the rate of acceleration of production. This may be zero acceleration or uniform production; it may be uniformly accelerated production or it may be irregular accelerated production. The last condition makes such a complete failure of an effort which purports to be manufacturing that I shall not discuss it further. The first or uniform production is probably the most economical one, but it precludes expansion of business and must necessarily be independent of any changeable outside influence. Uniform acceleration is an ideal way for the expansion or the retardation of a business; the combination of a period of uniformly accelerated production and then one of uniform production will take care of almost all the problems that must be met with in the course of business. From an analysis of a group of parts it is obvious that to produce the group at some particular time as a finished result, we must work upon the individual parts. On each part we may require different methods and different lengths of time. There must be some particular date that each event on each part in the group must be done, so that the group can be finished at its particular date, in other words, the raw materials must be requisitioned sufficiently early to allow the vendors to produce and deliver to our stores in time to go through production and assembly before the final date. This is true with each part.

The control board layout is made on this principle. Horizontal distances are considered units of time. In the particular board under discussion each one-half inch along the board represents a working day. Each mechanical operation and every event for every part that goes into motor car construction is displayed. The particular place of each event on the board is marked by a machine symbol or symbol to represent the department or task. The placing on the board of the different elements is determined by time study. Up to this point the factor of date has not entered the problem and the factor of time only is considered in the preparation of the board. Our plan of manufacture is for stock but according to a direct schedule. The schedule of the cars with models and type are specified by the general management and according to our fundamental of uniform production or uniform acceleration. If it is an accelerating production it can be represented by a curve as shown in Fig. 15, in which uniform intervals of quantity are laid off on the curve and then projected down to the base line. Acceleration of production begins at the earliest event rather than at the last event as is usual under the old plan. The succeeding production is thus provided with a solid foundation for its support.

It became evident from an early study of this plan that charts or drawings would not be sufficiently flexible

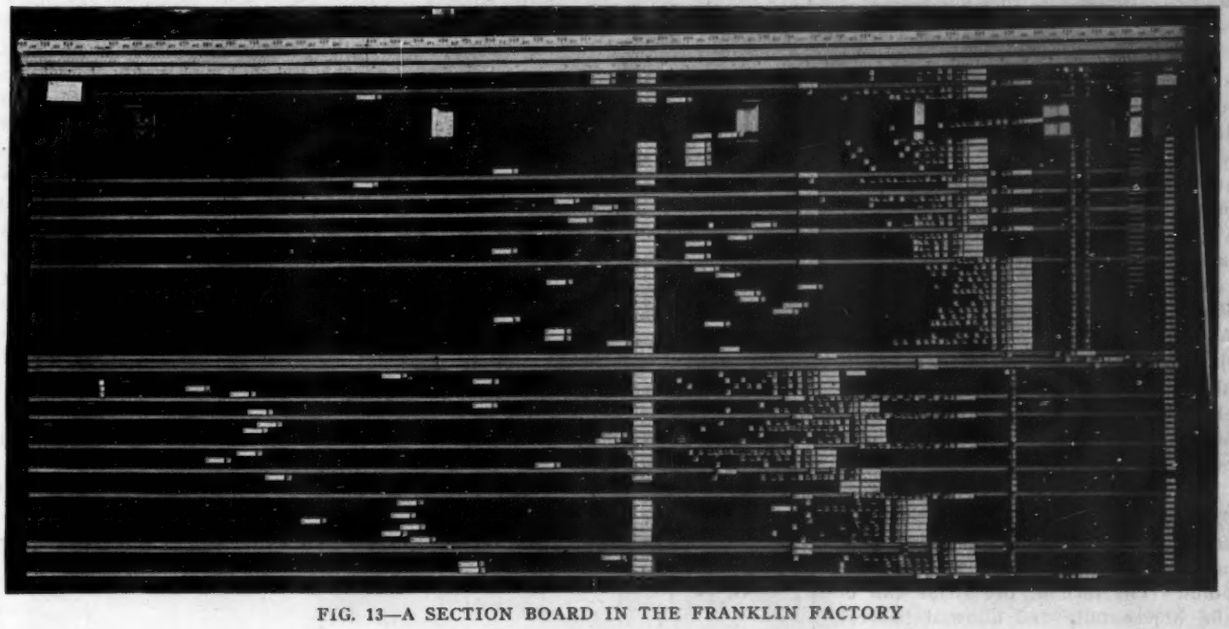


FIG. 13—A SECTION BOARD IN THE FRANKLIN FACTORY

A paper presented at the Worcester meeting of the National Machine Tool Builders' Association, April, 1914.

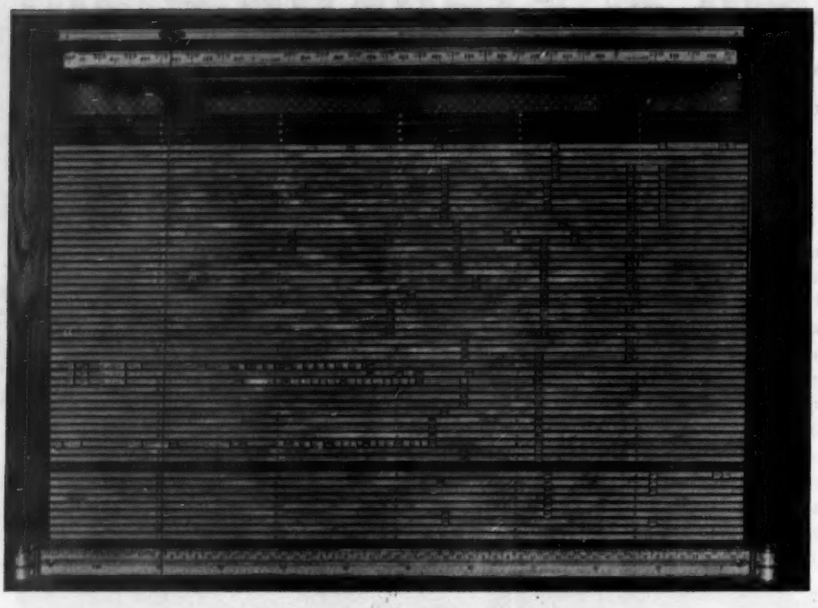


FIG. 14—THE CONTROL BOARD

to carry it out with economy and comfort, and a mechanical device was designed and constructed in our works which seems to have fulfilled this requirement perfectly. It is rather elaborate in its form. Fig. 14 will give a general idea of its construction and layout. This illustrates the master control board. Fig. 13 a section board. Fig. 14 is 7 x 5 feet, and Fig. 13 is 7 x 10 feet. The detail of the stations is shown in Fig. 16. The white block sets of each station which includes the number and base marker are ½ inch square and stand ½ inch out from the board.

The face of the board is made of ½ inch wide by ⅛ inch thick metal strips. The cages of vanadium steel can be clipped on to the strips at any point. The face of the strips can be slid horizontally and allowed to rest, thus changing the position of any particular part but maintaining the time setting of each event of the part. The board can be opened at any place and one or more new parts inserted. The complete record of our work is taken from these boards by photographs. The time saved by this and the fact that we pay no attention to items that are up to schedule has more than offset the cost of preparation of the equipment and it is now a continuous asset.

The fact that all our data is displayed publicly to our supervising force, and also that all individuals throughout the works receive their instructions from this source maintains a degree of accuracy much higher than we were ever able to obtain when using paper records.

From the standard board as shown and through the mechanism of the board, we write and date manufacturing orders, job cards, stores issues, move tickets and tags. Any set rate of acceleration or uniform effort can be changed by the production manager inside of a few hours and the whole scheme of date of production be changed within 20 days to exactly agree with the new plan, and this without confusion. If we wait 20 days after any such change the orders in the works will have expired and the new orders with new dates will follow into process.

It is, of course, desirable, as mentioned above, to have uniform production, or uniform acceleration. Fig. 20 will illustrate uniform schedule per day. It shows a schedule assumed and requested by the sales organization in the solid heavy line. It shows the schedule of assembly as adopted in the heavy dotted line. Analysis of the product developed the fact that 60 per cent of the cost of the materials going into the product was contained in 59 out of approximately 1,051 parts. That of these, 44 parts, and one-half of the material cost went into the car on the assembly floors as finished purchase parts. Practically all of the other parts represented so small a relative material value that we could operate our producing labor on a strictly uniform schedule or uniformly accelerating, but make the final assemblies of parts on a variable schedule. These variations, however, of course, should not be so violent as to change workmen on our assembly floors throughout the season more than 30 per cent, in other words, we should not change more than one man in every three on the assembly floor, and thus maintain two-thirds or 60 per cent of our fixed force of trained men. Cars are assembled only according to the heavy dotted line, and the expensive materials mentioned are ordered for delivery to agree. The capital investment in the parts which are worked upon by the direct labor is relatively small, and the carrying of this investment does not prove to be a burden.

As to how this control plan of supervision can master its problem, we show in Fig. 18 a schedule of uni-

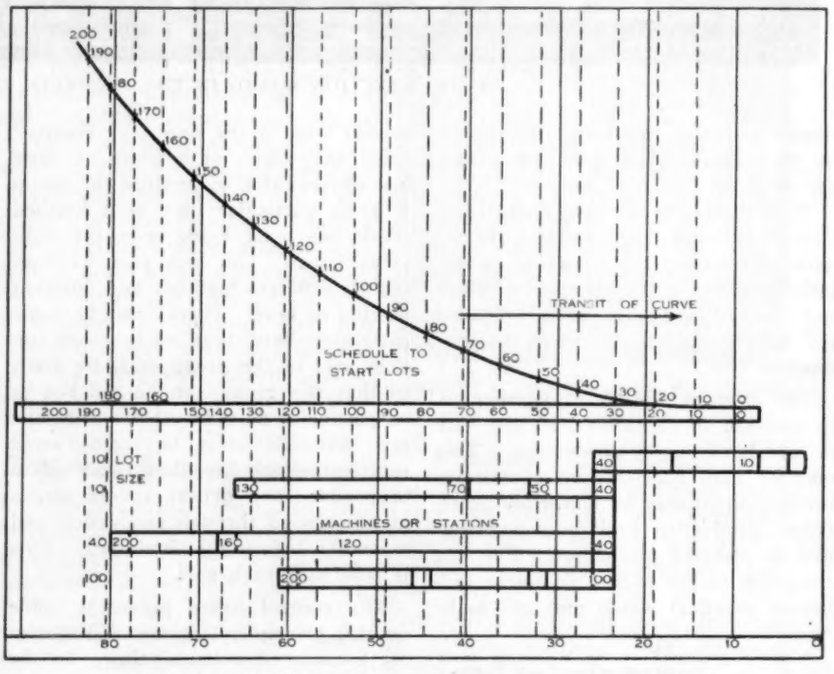


FIG. 15—SCHEDULE FOR ACCELERATING PRODUCTION

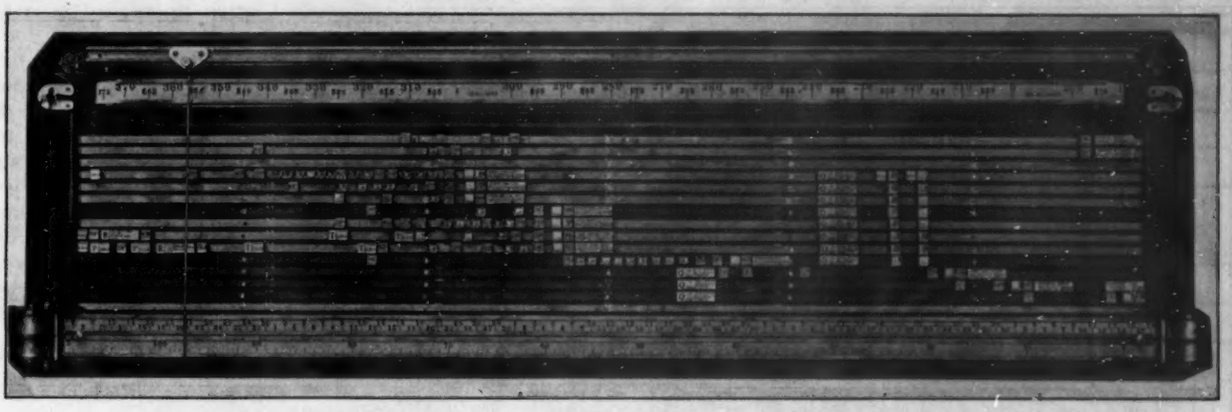


FIG. 17—CONSTRUCTION OF THE BOARD

formly accelerated production under which we are now working. The dotted line is the line of uniform acceleration of cars per week. The lower curved line is a summary of this, and the broken zigzag line our accomplishment toward this acceleration in the new 1914 car. The cause of this wide variation in this last curve is due usually to single items, such as are noted on the curve. They do not in any sense represent the productive effort.

Due to the fact that the production of a given model of car from its inception to its finish is over a long period of time we have developed frequent checks as to our accomplishment in addition to the control board. This is illustrated by Fig. 19. Since the lots are maintained of uniform size, and lot size of assembly or part is made by subdivisions or multiples of the lot size of the car, they represent a convenient index of our effort. This is very noticeable when comparing the curve of "lots finished" to the curve of "daily cars produced passed sales". The cost of the car is readily indicated by the "producing hours per lot finished" when we know the lots required per car and the average workmen rate per hour.

Despatching

Fig. 21 shows the method of carrying instructions from the control board into the hands of the workmen. This latter part of the plan was one of the first installations made by Carl G. Barth. The works is divided into five departments, each department of which is controlled by a despatch room. In this room are maintained the route sheets which show the operations and machines upon which they are performed for each part. On the route sheet is recorded the movement from one operation to the next. The room contains racks as shown. Each rack is made of sections, and each section sub-divided into three parts. Each section represents a machine. This is shown by the symbol on the tag, as 5DS, meaning: No. 5 Sensitive Drill. The front compartment in the section contains a coupon which matches a job card that is in the hands of the workmen. In the second compartment this coupon and job card fastened together show the work ahead of the machine. In the third, or back compartment, the coupon job card and small foreman's coupon show the work in process, but yet to come to the machine. The tag which hangs beside the symbol carries the clock number of the workman if work is in process on that machine, or a tag with a machine symbol if the machine is idle. The job cards are arranged in the back compartment in order of drawing number and lot number. In the middle compartment where they are waiting at the machine, they are arranged in order of date as put on by the schedule section from the control board. When a machine is started, a job card and inspector's coupon are separated. Both inspector's coupon and job card are stamped with a time stamp. The job card is given to the workman and the inspector's coupon placed in the front compartment.

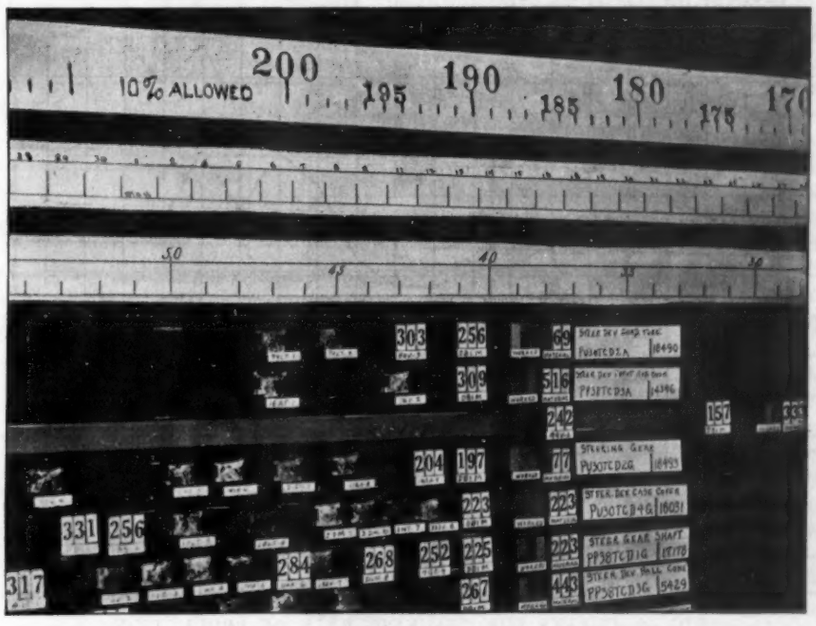


FIG. 16—DETAIL OF A STATION

Proper orders have been given and information received that the tools and equipment are at the machine before the order is given to the man. The foreman has nothing whatever to say with regard to the order of work to the machine, this being settled entirely by the order of dates and no one except the production manager specifies the date of each of these operation cards.

In case of a machine under repair, or some other interference, the route department is immediately consulted if the problem is not readily solved by the despatch clerk and the foreman in conference.

The middle compartments of the section show at all times the amount of work ahead of the machines. This is also shown on the control board, and in addition on this control board

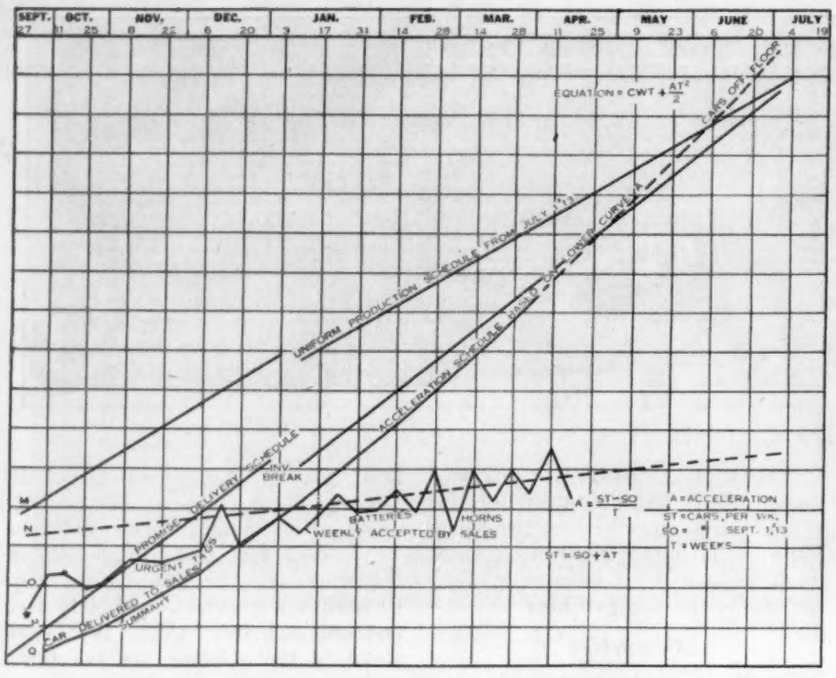

SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY
EQUATION = CWT + AT²/2
CARS OFF FLOOR
UNIFORM PRODUCTION SCHEDULE FROM JULY 1, '13
LOWER CURVE
ACCELERATION SCHEDULE FROM JULY 1, '13
INV. BREAK
PROMISED DELIVERY SCHEDULE
BATTERIES
HORNS
WEEKLY ACCEPTED BY SALES
A = ST − SO / T
A = ACCELERATION
ST = CARS PER WK.
SO = SEPT. 1, '13
T = WEEKS
ST = SO + AT
URGENT TAGS
CAR DELIVERED TO SALES
SUMMARY

FIG. 18—CAR SCHEDULE AND PRODUCTION

is shown the hours of burden on that machine.

When a workman completes his job the card is returned, stamped, the inspector's coupon of that job is put in the inspector's rack for inspection and the next job in order is handed to the workman. This transaction is checked on the route sheet. A move ticket is then passed out to the transportation department which moves the lot from one machine to the next. All orders in these racks will be finished approximately within 20 working days. Each transaction goes by the job card or move ticket to the person in charge of the control board and is there recorded.

In case any part falls behind schedule on any operation a "lot urgent tag" is placed on the job. This is a written instruction from the production manager to every one concerned that the work on the part must go on night and day with the greatest possible despatch. Of the parts shown in Fig. 21 only three operations are noticed to be urgent. There are a great many operations in the rack.

Machine Analysis

Before new machines are purchased the mechanical features are analyzed to determine their suitability for our work. This does not mean that they must be suitable only for a particular operation, but that the power, feeds and speeds of the machines must have the same ability as all other machines in the works used for similar purposes. Carl G. Barth has specified standard increments for feed and speed. E. C. Robertson, who has studied under Mr. Barth, resides with us as consulting engineer to carry on this work. Examples of this study are shown in Fig. 22. Mr. Robertson appends a short discussion.

"In a paper given before the National Metal Trades Association in April, 1910, on 'Bonus and Premium Systems', Carl G. Barth referred to one of the chief difficulties underlying such systems as being the 'unevenness' of machine shop equipment. By the 'unevenness' is meant the lack of standardization as applied to machine tools, and to parts used in conjunction with them. In another paper given before the National Tool Builders' Association in the spring of 1912, Mr. Barth offered a standard to be adopted for machine tool speeds and feeds. This suggestion embodies the use of a geometrical progression both for the series of spindle speeds on a machine and for the feeds provided on a machine. Inasmuch as the average tool builder today recognizes and uses a geometrical progression in speeds and feeds, the only important question remaining is as to whether the tool builder's progression agrees with Mr. Barth's proposed standard.

Machine Tool Purchases Standardized

"It might be stated here that this standard progression has been adopted in the Franklin plant. Hence, when purchasing a new machine tool, every effort is made to find a machine agreeing with this standard. In case of the failure to find such a machine, the next endeavor is to choose a machine which, with the fewest possible changes, can be reconstructed to agree with this standard.

"In the accompanying diagram, Fig. 22, example 2, shows by the light lines a logarithmic scale. The short, heavy vertical lines plotted in this example represent spindle speeds. At the top is shown thus a portion of the 'ideal' series from eight revolutions per minute to 256 revolutions per minute. Directly under (1) is shown the series on a certain make and size of turret lathe now in the Franklin plant. A

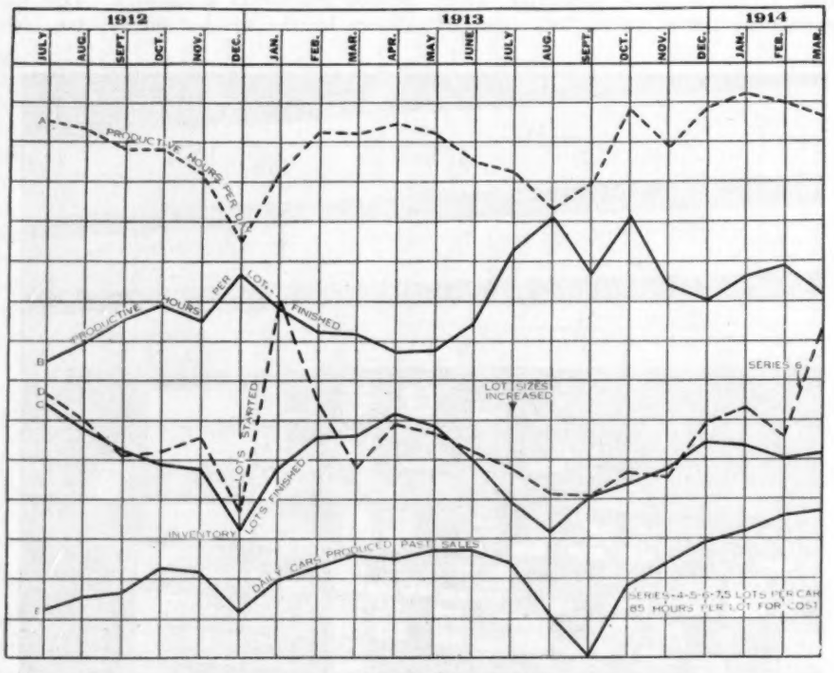

1912
1913
1914
JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR.
PRODUCTIVE HOURS PER CAR
PRODUCTIVE HOURS PER LOT FINISHED
LOTS STARTED
LOT SIZES INCREASED
SERIES 6
INVENTORY LOTS FINISHED
DAILY CARS PRODUCED PAST SALES
SERIES 4-5-6-7.5 LOTS PER CAR 85 HOURS PER LOT FOR COST

FIG. 19—CURVES FOR CHECKING RATE OF PRODUCTION

FIG. 21—CARRYING INSTRUCTIONS FROM THE CONTROL BOARD TO THE WORKMEN

comparison of this series with the ideal shows that it is as nearly perfect as can probably ever be obtained with gears and their inherent limitations. As originally designed by the builder the machine did not have such a series of speeds, but was redesigned by us and ultimately furnished thus by the builder. The machine (2) shown in this example also has a nearly perfect series. And strangely enough this machine was designed thus without any knowledge on the designer's part of the ideal series. In (3) and (4) machines are shown which are not perfect, but which with a little study could undoubtedly be refined so as to agree very closely with the ideal. It might be stated here that each one of these four represents a different make of turret lathe of practically the same size.

"Example 1, Group A, Fig. 22, shows the series on three different sizes of the same make of turret lathe. Here the light vertical lines represents speeds in a perfect progression and the logarithmic scale has been omitted. The 'unevenness' of the speeds is here very noticeable. Group B shows the same machines after an analysis of the gear ratios had been made. The slight percentage of variation here is again due to gears with their inherent limitations."

The matter of belt tension is important in order to maintain the machines at standard power effort. The proper tension and length of the belt being determined, it is obtained on the machine. The weight or pounds tension for the belt is set on a scale arm and the hand wheel is tightened until the strain lifts the arm to a horizontal position. The belt is then cut off, laced and put into service. Tests and adjustments are frequently made to preserve the standard.

Tools are routed from a central tool room and are returned through an inspector at the completion of the operation. They are moved under orders from the despatch section and are routed by the same orders. They are handled by the transportation section and when in storage are under the control of the route and production equipment section.

All Around Workmen

The workmen carry out the orders as written on their job cards and instruction cards. The necessity of interchanging work from one machine to another has made it essential for economy that we have an all around machine operator at each machine. That is, he must know how to handle his machine so that any job assigned to the machine may be prepared quickly and be finished accurately.

Due to the variety, it is of great help to them to have reference cards showing the different details of machine preparation and operation for each part. This keeps the work method standard and insures the proper tools being at the proper place on time. It is a very old-fashioned shop indeed that does not to some extent plan the way for its workmen, and it has been a long time since any

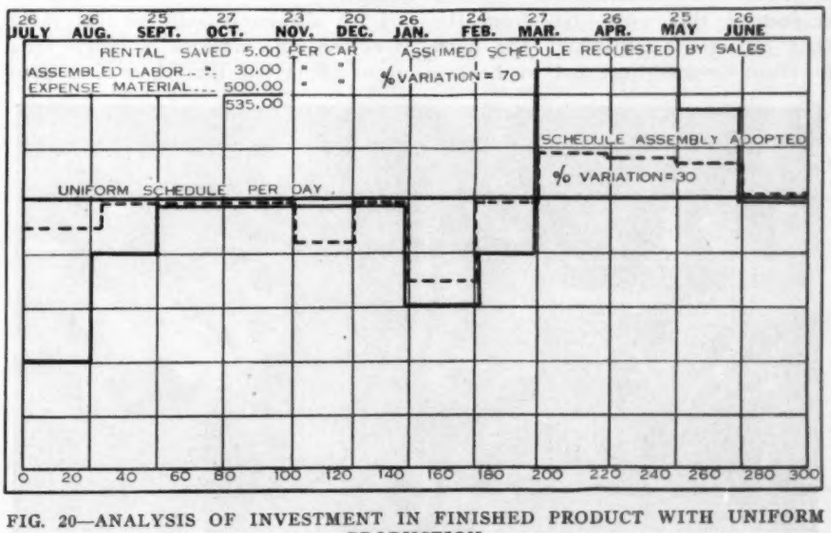


FIG. 20—ANALYSIS OF INVESTMENT IN FINISHED PRODUCT WITH UNIFORM PRODUCTION

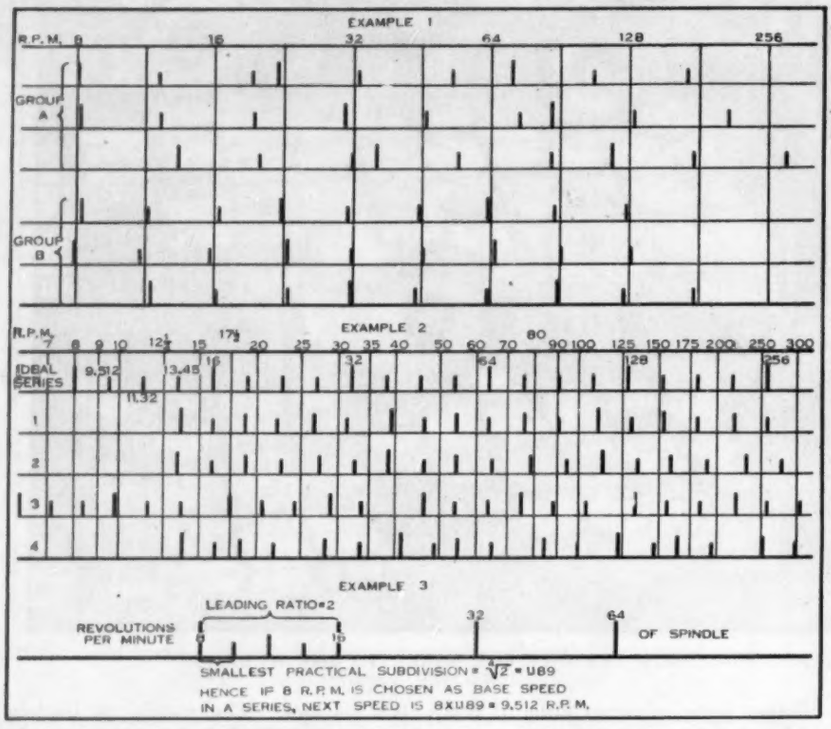

EXAMPLE 1
R.P.M. 8 16 32 64 128 256
GROUP A
GROUP B
EXAMPLE 2
R.P.M. 7 8 9 10 12½ 15 17½ 20 25 30 35 40 50 60 70 80 90 100 125 150 175 200 250 300
IDEAL SERIES 9.512 13.48 11.32 16 32 64 128 256
1
2
3
4
EXAMPLE 3
LEADING RATIO=2
REVOLUTIONS PER MINUTE
0 16 32 64
OF SPINDLE
SMALLEST PRACTICAL SUBDIVISION = $\sqrt[4]{2}$ = 1.189
HENCE IF 8 R.P.M. IS CHOSEN AS BASE SPEED
IN A SERIES, NEXT SPEED IS 8X1.189 = 9.512 R.P.M.

FIG. 22—THREE EXAMPLES FOR THE STANDARDIZATION OF MACHINE TOOLS

shop, except the simplest job shops, has required the workmen to put on belts, make tools, secure stock, make drawings, do clerical work and a hundred and one other things that a long time ago were part of the duty of the workmen. The tremendous inefficiency of such a plan has eliminated it. High efficiency necessarily requires specializing or singleness of purpose and this is the order of our effort.

It was noticed when starting time studies that the workman disliked very much to make a change of method, but when the change had been made he did not want to change again either back to the old or to any new method. A study of the workman at his task and his own methods will soon show that he does identically the same act for the same effort day in and day out, and this is strictly true of every one of us. To change means accelerating either positively or negatively. Accelerating requires force and of course that means work. It is the work caused by change that bothers workmen rather than the new method due to the change.

Time studies have been made almost entirely on the shop floors. These could be made in a time study laboratory with selected men, but we lose one of the most vital things for satisfactory conduct of this work, and that is what may be called the shop constant, and fatigue allowance. We must make our time studies under the conditions we expect to operate. If made in a laboratory we must expect to operate under the highest possible efficiency as indicated by the laboratory method after the work is put into the shop. Few shops have operating standard sufficiently high to do this. It takes time and a very great amount of work and cost to reach high standards, but it is without doubt the desirable end to obtain.

What the Workman Thinks of it

We are getting a fine group of workmen and trust that by continuous study and development we may reach a high state of perfection. It is difficult to determine what the true sentiment of the workmen is with respect to this work, but from the time of introduction there has been excellent co-operation, and we believe that there will be until all can thoroughly appreciate the fact that we are after the best things that can be found for those concerned. On the alternate day after the workman's effort, he is given a report of his accomplishment of the day. This report shows the parts worked on, the day work earnings and the premium earnings.

Our method of pay is a fixed day rate with premium, not because we have selected that as being the best, but for the reason that almost any method of pay, if based on time study, will be fairly satisfactory. Although I believe that none is so equitable to the workman and management as Mr. Taylor's differential piece rates. Since, however, this demands a higher standard of shop performance than we now have, it has as yet not been adopted.

Duplicates of the reports to the workmen are used for compiling the pay rolls, for the distribution of work hours and are posted to the workman's time and earning record, such as is shown by Fig. 24. This record shows among other things, lates and absences.

A recent study from this record of men working under time study shows a very high percentage of attendance and a considerable reduction in lates as compared to periods before they were working under time study. There was no indication, by absences or lates, of fatigue of the workmen. It is remarkable to note, as mentioned, that the attendance has been materially better, and is especially noticeable because the base or day rate was not reduced but has been gradually increased; the men's earnings are higher than before, so it is evident that they are not obliged to attend work on account of lack of sufficient pay as compared to the previous period.

I am absolutely satisfied that there is not only no increase of fatigue for a given effort but that there is a gen-

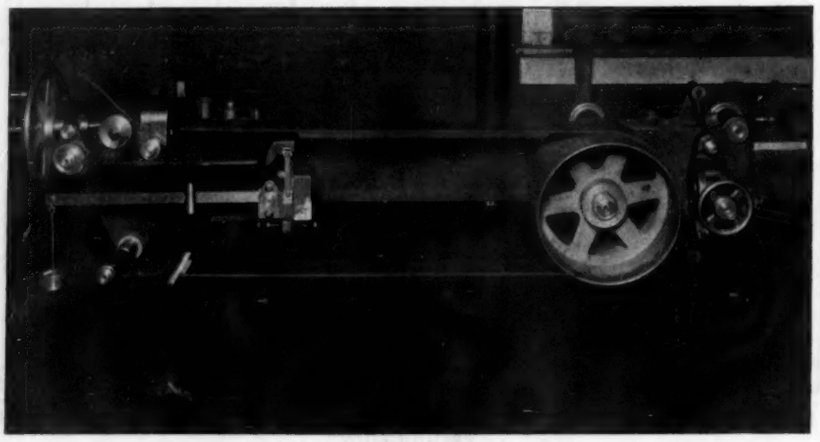


FIG. 23—BELT BENCH DESIGNED BY CARL G. BARTH

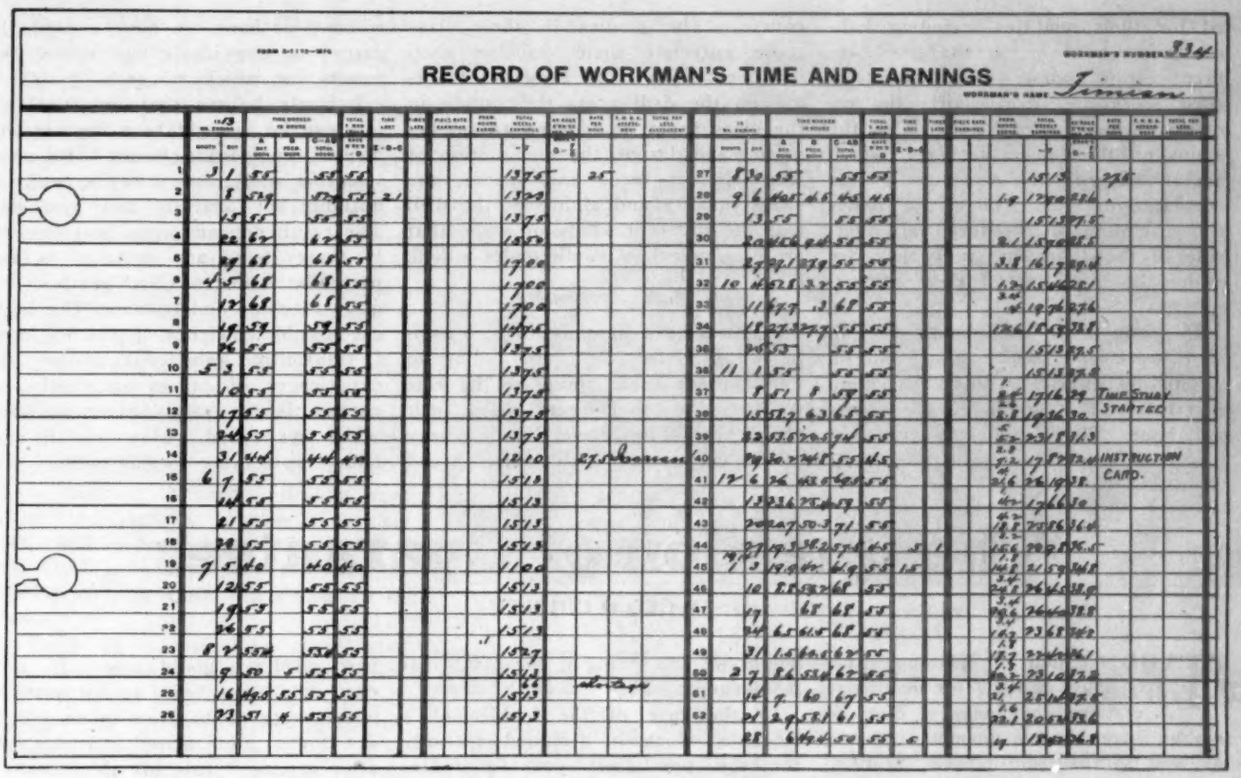
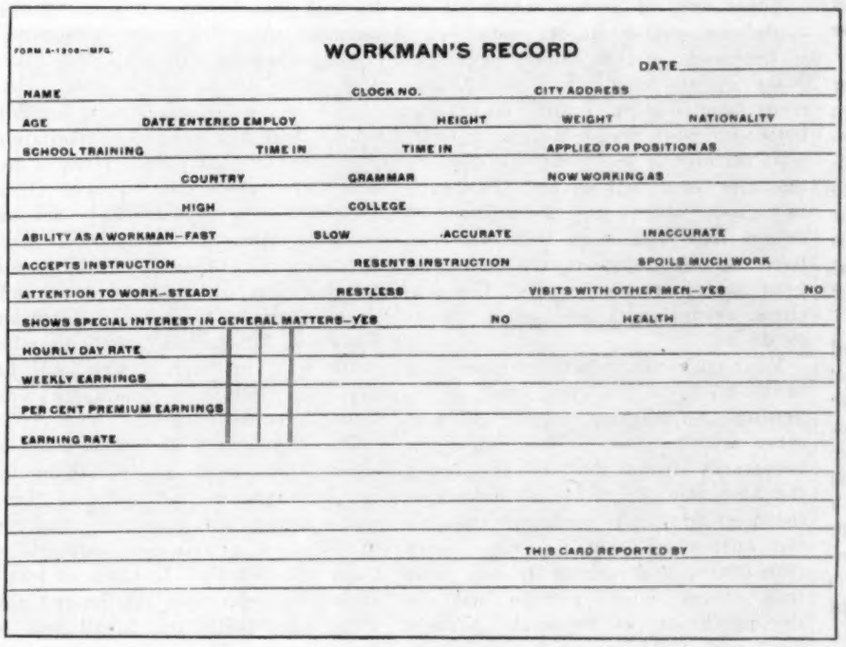


FIG. 24—RECORD OF WORKMAN'S TIME AND EARNINGS

eral decrease due to the continued uniformity of effort and the better preparation and maintenance of tools and equipment.

We maintain a workmen's record card, as shown in Fig. 25. The records are obtained from the works each three months and compared by each period. They are classified under the different headings and percentages as to total and are continuously studied. Thus we learn the percentage of different nationalities in our employ, the percentage of fast or slow men, the percentage working at the task for which they applied, etc. The data of the card is filled in first by the workman, then by the foreman, and then from the workman's earning record. After three or four periods have been reported for a given man, we obtain a first class statement as to his ability, and also as to whether he is working at the thing for which he applied. The fact that relatively few men are working at the task for which they applied may indicate that the men have gradually obtained that class of work which they found most desirable.

For some five years we have conducted an apprenticeship training school. Boys are admitted between the ages of 17 to 21. They are select-



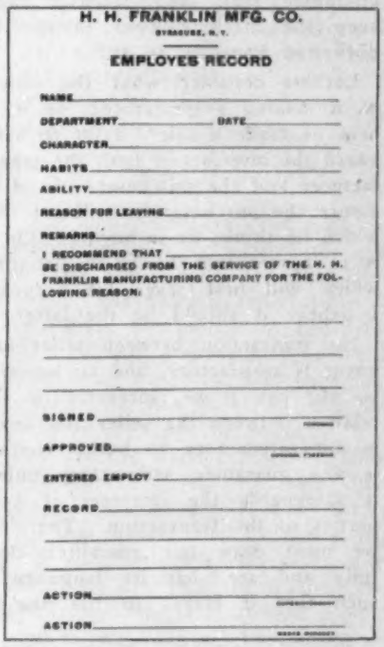


FIG. 25—VARIOUS EMPLOYMENT FORMS

ed for their qualities including habits and started in on the fixed apprenticeship course. Two hours of class work are given daily; the remaining hours are applied in the shops on their own machines, which are mixed with the machines of the regular workmen. They are under the discipline of the foreman. Outside of the shops in study they are under the discipline of their instructor.

The course is conducted over all shop work and tool making, and on graduation, after four years, the young men receive $100 bonus and 22¼ cents per hour. They receive pay to not less than $1 per day throughout their course. The studies in their class room correlate their machine shop practice. That is, if they are working on the drill press they study in the class room in addition to mathematics and design, the line motion of the machine, feeds and speeds, the shape, quality and ability of the drill and the different kinds of work that are economical to handle under a drill.

More Apprentices

We now have 30 apprentices, a number of graduates, and are adding to our apprenticeship force at the rate of 10 or 12 per year. With little change in our force we thus fill many of our vacancies. With men of broad training at hand we have courage to carry out our ideals and secure the results for which we seek.

I firmly believe that industrial effort can be brought to a high attainment through management based upon scientific study, and scientific study is nothing but analysis and synthesis. The result depends upon how perfectly these items are obtained in any particular industry. Such methods require teaching and training. The highest possible efficiency of which I know is transmitted knowledge; history, the experiences of others accurately recorded, is the solid foundation over which we speed. May we all contribute something to this end.

The Question of Guarantees

BY GEO O GRIDLEY

THE question of guarantees has troubled mankind for many generations and today it costs us not an inconsiderable amount of money as well as time and trouble to maintain our guarantees, notwithstanding our endeavors to put in safe limitations. Why is this? Why have we gone on and on generation after generation making guarantees that have cost us so much money and trouble? Is it because we have deliberately misrepresented our machines? Is it through a misunderstanding of the language used in our guarantees? Is it from the lack of good judgment on our part as to what we can perform? Or is it from a desire on our part to so word our guarantee that the purchaser must keep the machine even though he does not want to do so?

Let us consider what the object is in making a guarantee? Is it to help us make a sale? Is it to safeguard the interests of both the manufacturer and the purchaser? Is it to assure the purchaser he will get that which he thinks he is buying? Or is it to assure him he is to get that which will best serve his purpose? I believe it should be the latter.

No transaction between seller and buyer is satisfactory, and no business is, nor can it be, successful if the relation between the seller and buyer is not satisfactory to both. Neither is any guarantee satisfactory unless it safeguards the interests of both parties to the transaction. Therefore we must draw our guarantee carefully and see that its language is such that it means to the one to whom we are giving it the same that it means to us.

In the case of the builder of a machine which is designed specially for the purchaser, your guarantee should be drawn very clear and definite so as to safeguard both parties, because there are many elements over which the other has no control. With the manufacturer of a standard line of tools which are built in lots and which are not built special for each individual customer, the situation is different, and it is not necessary to have the guarantee so definite as in the case of the builder of the special machine, because if one does not want the machine he can sell it to another.

There are, of course, cases where a definite guarantee of performance is necessary, and it should be given. Make your guarantee broad and short, and without limitations. It is better for your customer and for yourself, because it will cost you less to maintain such a guarantee than any in which there are limitations so drawn that you may feel that you have met your guarantee and that your customer should keep the machine, even though he does not want to do so.

Your guarantee should be such as to assure your customer that he is getting the machine which will best serve his purpose. This does not necessarily mean that he is getting the best machine of its kind, because the most accurately made machine and the one which will do more work than others, and necessarily cost more than others, might not be best for the purchaser, as he might perhaps need and could use to better advantage that extra money which the best machine would cost. If, however, you have been so fortunate or unfortunate as to have taken his order for a high priced machine, and after getting it into his shop, he realizes that there is only a little work for it which need not be accurate and that a cheaper machine would have been better for him to buy, what do you do if he comes to you and states the case clearly and honestly? Do you take it back or not? If you take it back your guarantee with safe limitations has not been of any financial benefit. If you do not allow him to return it, what happens? If he is honest with himself, he pays the account when it is due and then when he requires more machinery he will probably go to your competitor and place his order with him.

Can your loss on this order placed with your competitor under these conditions be charged to anything other than the cost of maintaining your limited guarantee? I say it cannot and that it can be and should be charged against that account. Open an account in your books under the heading "Cost of Maintaining Limited Guarantees"; also one under the heading "Cost of Maintaining Unlimited Guarantees", and see which costs you the more. You will find that the unlimited guarantee costs less than the other.

The company with whom I am associated has made a great many limited guarantees, as well as broad ones, and I am frank to state that the limited guarantees cost us the more to maintain. It costs us less to secure an order with the limited guarantee than with the broad and unlimited one. This is because it takes

(*Continued on page 224c*)

Paper presented before the National Machine Tool Builders Association.

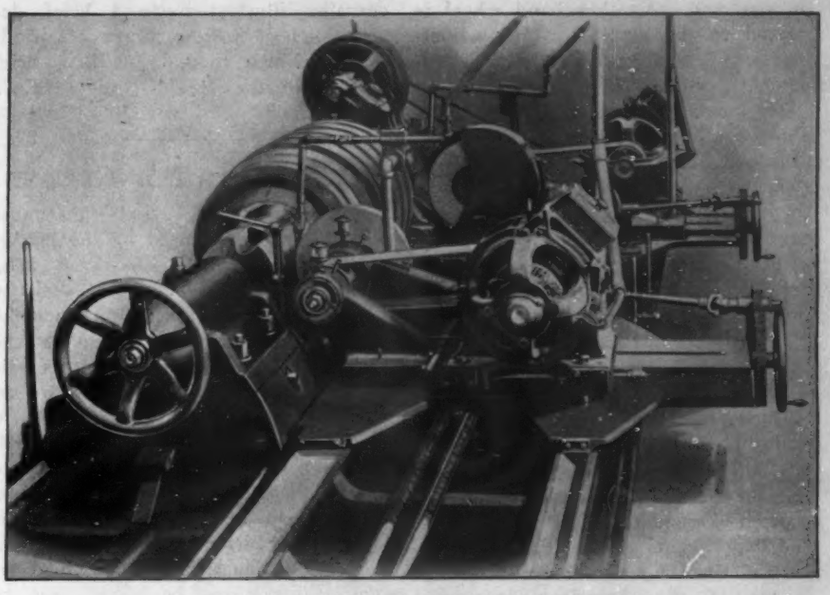
Electric Tap Hole Drill

The Van Dorn Electric Tool Co., Cleveland, has designed a special portable electric drill for opening the tap holes of blast furnaces. It is intended to take the place of the time honored hand drill. These tools have sufficient power to drill 2½-inch holes without any danger of stalling. When in operation, the drill is supported by a long handle as shown in the accompanying illustration. The operating switch is placed in the end of the handle and is so designed that the power is automatically cut off as soon as the operator lets go of the handle.

It is said that a furnace can be tapped with this machine in less than five minutes, the actual drilling time not exceeding two minutes. The electric drill is withdrawn when within an inch or so of the iron, the final tap being made as usual with a long bar of steel.

Drills of this type are being used by the Carnegie Steel Co., Pittsburgh, at its various blast furnaces. The drill shanks are about 10 feet in length, about 3 feet of which is twisted. The drill is 2½ inches in diameter. At the Edgar Thomson plant at Pittsburgh, the drill is hung on a special crane which is so arranged that danger of accident to the operator is obviated. The operator can let go of the drill at any moment and it will swing into the clear.

It is important to report accidents, but it takes less time to prevent them. Two minutes' work or care will often prevent an accident that you can't gather all the evidence about in two days.



ELECTRIC DRIVEN ROLL GRINDING MACHINE

Roll Grinding Machine

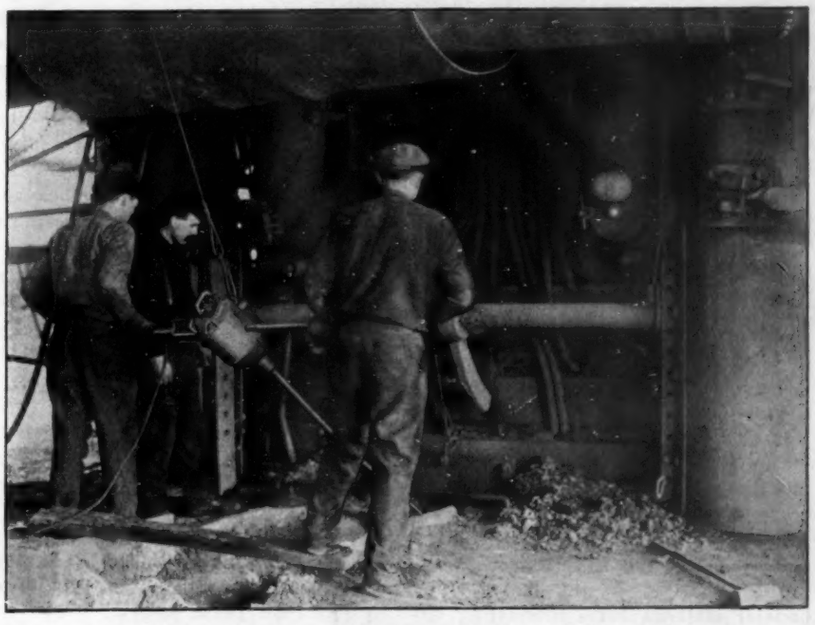
The accompanying illustration shows a roll grinding machine recently built by the Standard Engineering Co., Ellwood City, Pa., the machine swings being designed to grind rolls up to 21 feet in length. The complete grinder weighs 80,000 pounds.

The machine is equipped with two grinding heads, both of which are on the same side of the roll; it is designed to grind both the necks and the bodies of the rolls. The roll is carried on dead centers and is driven by a 10-horsepower variable speed motor mounted on the head stock. Motion is transmitted to the roll by two sets of worm gears entirely enclosed in an oil-tight case and provided with ball thrust bearings. The head stock is fixed at one end of the machine; the tail stock is movable longitudinally by means of a rack and pinion fitted with a ratchet. In addition to the longitudinal movement, the tail stock also has a transverse adjustment for lining up and grinding tapers.

Each of the grinding heads is provided with a 26-inch wheel, driven by a 15-horsepower motor mounted on the grinding wheel carriage. The motor is of the variable speed type in order that the peripheral speed of the wheel may be kept uniform as the diameter is reduced through wear. Each wheel is protected by a heavy steel guard. The guards may be removed with minimum loss of time when wheels are changed.

Travel of Heads

The longitudinal travel of each head is obtained by a screw driven by gearing and a belt from the head stock motor. The gearing has clutches for controlling the motion of the grinding head and is operated by a handle which may be set at any convenient position on the front of the bed. Clutches also can be operated by a stop on the carriage, which allows a continuous motion in both directions. This motion of the carriage also may be obtained by means of a hand wheel which revolves the screw when the clutches are disconnected. The transverse travel of each grinding head is accomplished by means of a screw having a hand wheel mounted



TAPPING A BLAST FURNACE WITH AN ELECTRIC DRILL

on one end. Another hand wheel is geared to the screw for fine adjustments. Both hand wheels are conveniently located.

The machine is provided with devices for truing grinding wheels so arranged that the wheels may have their edges rounded to suit fillets in the roll necks. Housings are provided for carrying the roll by its neck as well as on centers. The housings are adjustable so that rolls may be "crossed" or tapered.

Water Cooling System

During the summer the problem of securing suitable drinking water is one that faces every plant superintendent. That temperature is an important consideration is shown by the experiments of Dr. Thomas Darlington, secretary of the welfare committee of the American Iron and Steel Institute. He found that the range of temperature at which water is palatable is extremely limited. It is most enjoyable when at 50 to 55 degrees Fahr. At this temperature it has a stimulating action on the heart, and relieves fatigue and exhaustion by equalizing the temperature of the body. Water that is warm is insipid and uninviting. Water which is very cold, as is well known, is liable to cause illness. Absences from work and inefficiency, particularly in the summer, have been definitely traced in many cases to the lack of a proper supply of drinking water.

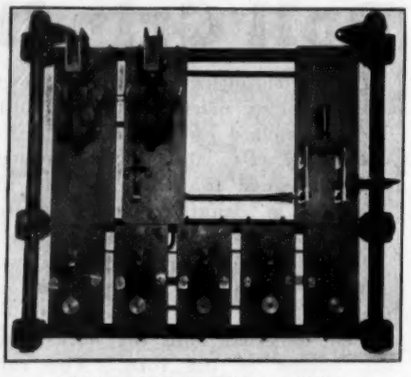
A new system for properly cooling and distributing drinking water has recently been placed on the market by the H. W. Johns-Manville Co., New York. The water is cooled to the proper temperature in a refrigerating machine and is then piped to bubbling fountains placed at advantageous locations throughout the plant. The refrigerating machine uses sulphur dioxide vapor and the working mechanism is entirely enclosed. It is said that the machine requires but little attention and that it will operate for years without refilling. A thermostat is arranged to start and stop the machine at certain temperature limits thus automatically keeping the water at a uniform temperature all the time. This system eliminates the disadvantages connected with the use of ice.

A very attractive souvenir booklet was issued by the Heald Machine Co., of Worcester, Mass., at the time of the recent convention of the National Machine Tool Builders' Association and the National Metal Trades Association. In addition to characteristic views of the Heald plant, the booklet contains illustrations and brief descriptions of various types of grinding machines together with a brief history of the Heald Machine Co.'s business.

Protection For Cranes

A new protective panel for cranes recently has been placed on the market by the Westinghouse Electric & Mfg. Co., East Pittsburgh. It is designed for use in connection with manually-operated, non-magnetic controllers and serves a two-fold purpose. It is said to provide complete protection to the crane motors and electrical equipment from overloads, grounds and short-circuits and also to prevent injury to workmen while making repairs by locking the line switch in an open position.

The line current is controlled by a double-pole line switch which is so arranged that it can be locked open by padlocks inserted by men at work on



CRANE PROTECTIVE PANEL

the cranes and cannot be closed until all the padlocks are removed.

Each side of the line is opened and closed by a magnet switch controlled by a series relay in each motor circuit and one in the common side of the main circuit. If the current at any point rises above the setting of the relay the magnet switches are opened and the current cut off. Since both sides of the line are protected by the relays, their failure to operate because of grounds is impossible. The relays are reset automatically after operating but the magnet switches will remain open until a push button in the crane cab is pressed, thus preventing the motors from starting unexpectedly.

A booklet describing Vismera pure iron sheets and plates has recently been issued by the Inland Steel Co., of Chicago. Vismera plates and sheets are said to contain 99.86 per cent iron without copper or silicon. A typical analysis shows 0.118 per cent total impurities existing in the metal. The booklet includes some interesting descriptive matter regarding Vismera metal together with specifications of black and galvanized sheets and plates made of this material.

Manufacture of Steel Castings

"The Manufacture of Steel Castings", with special reference to the use of the Tropenas converter, is the title of a 48-page booklet issued by the Tropenas Converter Co., 50 Church street, New York City. Steel is defined and its various methods of manufacture are outlined briefly. The production of steel castings by various processes also is discussed and the history of the pneumatic process is given. Considerable detailed information regarding steel foundry practice by the Tropenas converter process is included, giving mixtures, analyses of iron used, methods of operating the converter, etc. This booklet should prove of value to manufacturers of steel castings generally, as well as to those interested in the installation of equipment for this work. The booklet is well illustrated with views of installations.

Cambria Reference Book

A new edition of the standard reference work published by the Cambria Steel Co., Johnstown, Pa., has recently come from the press. This edition is prepared by George E. Thackray, special engineer of the Cambria Steel Co., who has compiled and edited *Cambria Steel* for several years. The 1914 edition contains most of the matter of previous editions which, however, has been revised to conform to present practice. Considerable new matter has been added. The list of angles has been rearranged. The tables of weights, dimensions, properties, loads, etc., have been amplified by the addition of data relating to the new sections which are now rolled. Like its predecessors, the book is well bound in limp leather, and has an unusually attractive appearance.

The Ideal Electric & Manufacturing Co., Mansfield, O., has furnished thirty-two 25-horsepower squirrel-cage induction motors for the new ore dock of the Duluth, Missabe & Northern railway at Duluth. These motors will handle the spouts. They will operate on 440-volt, 3-phase, 25-cycle alternating current. Each motor will operate a group of 24 chutes. The dock on which these motors will be installed was fully described and illustrated in the January 22, 1914 issue of THE IRON TRADE REVIEW.

A High-Speed Multiple Drill

A high speed multiple drill recently has been placed on the market by the Baush Machine Tool Co., Springfield, Mass. This machine is of a new design and is the largest of a line of four. It is massive and rigid in its construction, but light and convenient for the operator to handle.

The main drive consists of a pair of spiral gears, the pinion being hard steel and the wheel hard bronze, both of which run continuously in a bath of oil. The horizontal drive shaft at both top and bottom runs on Hyatt roller bearings. The weight of the vertical shaft and main spiral gear is taken on a ball thrust bearing.

Accurate Counterweight

The head is counterweighted accurately by means of two cables and an equalizer as shown in Fig. 2. These cables pass over a safety locking device, so that if either one or both fail, the head will be locked to the post absolutely preventing its falling. The counterweight is provided with a large recess so that scale or truing weights may be added when using heavy drills and sockets, the head at all times being maintained in balance.

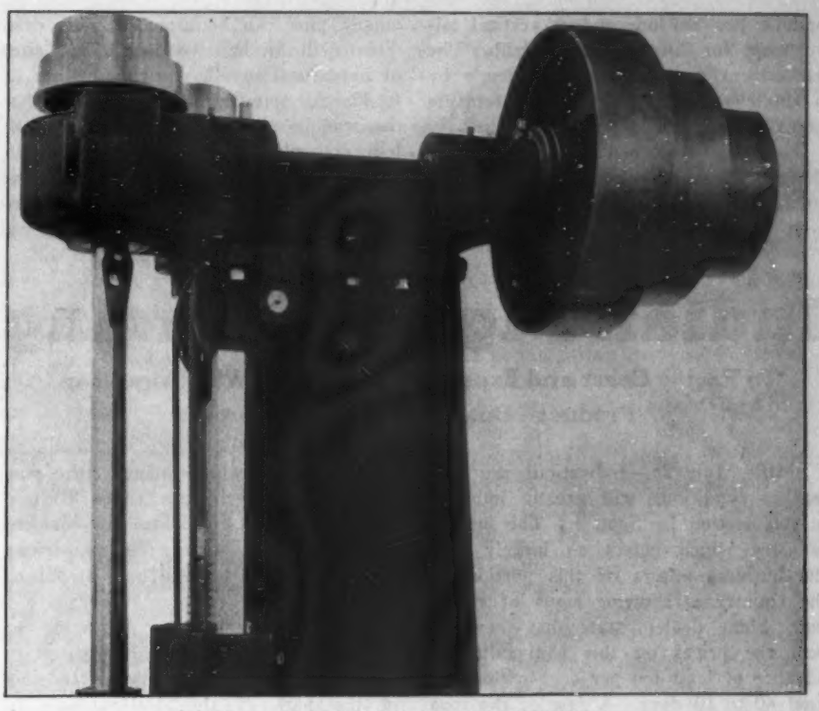


FIG. 2—CLOSE VIEW OF TOP OF DRILL

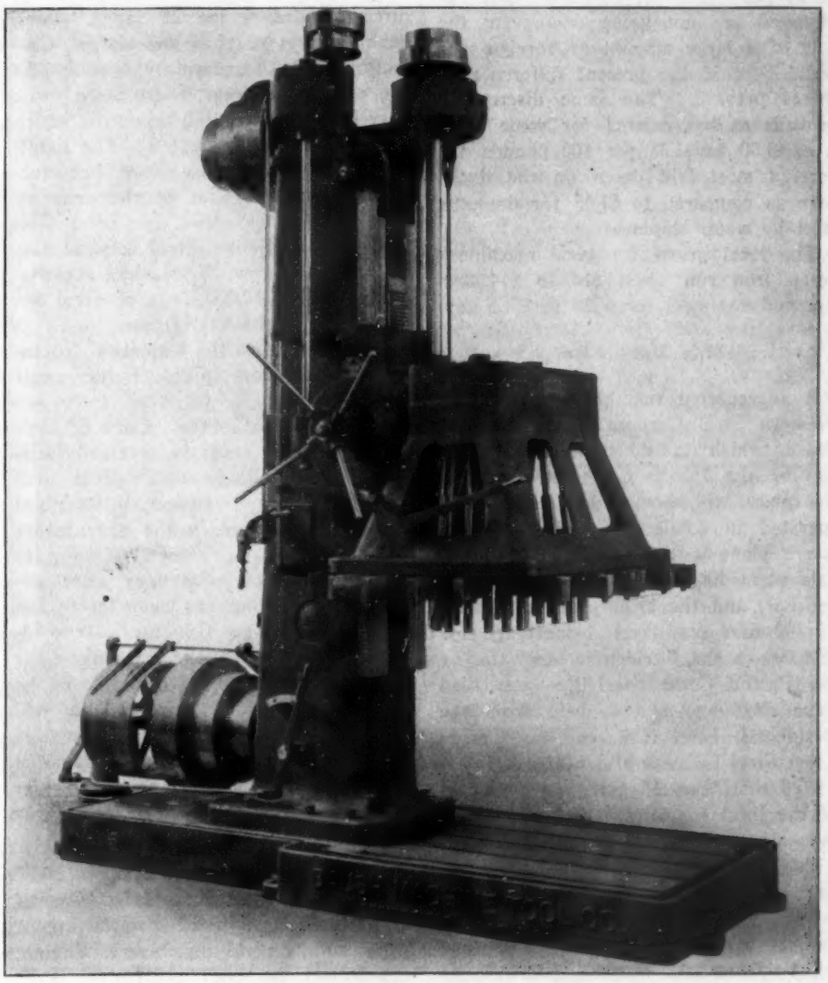


FIG. 1—BAUSH HIGH SPEED MULTIPLE DRILL

The feeds, four in number, are arranged so that two changes are obtained by means of a cone pulley and two by gearing. The gearing is controlled by a jaw clutch, which is operated by a lever within convenient reach of the workman. By this arrangement, when drilling cast iron, for example, the two coarser feeds would be used, the belt being placed in that position. If steel only were to be drilled, the belt would be set for the two finer feeds and ordinarily never changed. The feed is thrown in and out by means of a lever, on the side, which controls a swinging worm. The worm is carried on a ball thrust bearing in a swinging frame which keeps both worm and wheel submerged in oil. The feed is provided with an automatic feed stop and the return of the head is accomplished by hand by means of the lever shown in Fig 1.

Various Sizes of Heads

The head shown in Fig. 1 is rectangular and various sizes can be supplied on this machine, up to 24 x 52 inches. The arms and spindles are universally adjustable anywhere within this layout and are so constructed that they will operate on close centers. There are no projections in the shape of lugs or bolts to keep them apart, so that they will operate on centers equal to the diameter of the spindle nose plus a slight running clearance. An independent ball thrust bearing regularly is furnished with these spindles and each

spindle has an independent vertical adjustment for different length drills. The adjustment is controlled conveniently by a single screw on the extreme outside end of the arm.

The post and bed are of massive design. The bed is provided with a return groove for lubricant, skimmer, weir and tank, so that a pump and supply pipe can be attached with ease. This drill is built with various sizes of heads and spindle equipment from 12 to 40. All spindles are arranged so that they can be removed when not required, leaving only the necessary parts in operation. With this machine it is possible to set up the drills for any irregular layout in a few minutes.

Indian Pig Iron Coming

To Pacific Coast and Expected to Compete With American Product—Business Outlook Improves

Seattle, July 25.—Indications are that market conditions will greatly improve in this section by Sept. 1. The lumber industry which enters so largely into the business affairs of this portion of the country is showing signs of reviving. Some dealers state that they expect the prices on this commodity to advance at least ten per cent within the next 40 to 50 days. A few of the iron and steel plants report more active buying by the timber interests. They are showing a tendency to stock up, a thing they have not been willing to do for some time past. A number of sawmills are under construction, which indicates that business is expected to improve. Bedrock prices have undoubtedly been reached and changes have not been material for some time.

The demand for reinforcing steel has improved the local situation a little. King county is starting on the erection of a court house to cost approximately $1,000,000; the Metropolitan Building, a $500,000 business structure, and various other buildings under way or in contemplation make Seattle an active building center at this time.

Comparison between foreign and local prices is still somewhat difficult. Foreign pig iron does not run as uniform as the American product. It is claimed that reliance can not be placed upon it; that chances are taken when it is bought. If it does not come up to specifications, it can not be sent back as can the American product; the American product is capable of better delivery; there is nothing definite about foreign prices and in view of the fact that there is only about 50 cents a ton in favor of the foreign product laid down here, it is not expected that any very heavy orders will be brought in from the ordinary foreign sources. There has been a slight raise in price during the last four months, domestic running from $22.50 to $24.50 per ton.

But there is a considerable tonnage of Indian pig iron booked for the Puget Sound district. This is the new high grade pig iron whose manufacture was described in THE IRON TRADE REVIEW of July 23. It promises to compete very strongly with the American product and will be sold here at $21 to $22 a ton.

Foreign competition is beginning to enter largely into the local situation in structural steel. There is a tendency on the part of the dealers here to pay more for the American products of this nature because the dealer knows what he is getting and is dealing with reliable people. But evidently these advantages are not going to prevent the sale of a large amount of foreign material here if the present difference in prices prevails. The same discrepancy prevails as has existed for some time, i. e. $1.30 to $1.35 per 100 pounds for foreign steel laid down on the docks here as compared to $1.65 for domestic steel by water shipment.

The local prices for good machinery scrap iron run from $14 to $14.50 a ton and for steel scrap $4 to $5 a ton.

May Move Plant

It is reported that the plant of the Western Steel Corporation at Irondale, Wash., which was taken over some time ago by the Pacific Coast Steel Co. of this place, will be moved to Seattle and operated in connection with the company's plant at Youngstown. The Irondale plant has a capacity of 150 tons per day, and the local plant a capacity of 100 tons per day. A mortgage for $200,000 to the Occidental Steel Co. by the Pacific Coast Steel Co. was filed some days ago and a deed from the Occidental Steel Co. to the Pacific Coast Steel Co. was also filed. It is reported that Wm. Piggott, vice president of the local company, who has been in the east working on matters connected with the removal of the plant, will arrive in Seattle shortly to oversee the removal. The Irondale plant has been defunct for some time and is the one which James A. Moore undertook to operate. It consists of three open-hearth furnaces with one 22-inch blooming mill, one 14-inch bar mill and one 9-inch guide mill. It uses scrap steel and Chinese pig iron as raw material. The local company is reported to have paid $300,000 for the plant. T. Scott Clingan, present manager of the local plant, is slated to manage both concerns.

Prospects

More Encouraging for Canadian General Electric Co.

Toronto, July 28.—Frederic Nicholls, president of the Canadian General Electric Co., states that while there is some falling off in the volume of orders received, the Allis-Chalmers department has booked more orders in the past six months than in the corresponding period last year. Orders for electrical apparatus are less because no large new enterprises are at present being proceeded with. Prospects, however, are more encouraging now than they have been for some time. The company is finishing up contracts for locomotives for the Intercolonial, Canadian Pacific and Canadian Northern Railways, and has on hand orders for 25 more, which have not yet reached the shops. Collections are surprisingly good. At the end of the year, there were some very large outstanding accounts, which have since been collected. The liabilities of the company have been reduced since the first of the year by over $2,000,000.

The Nova Scotia Steel & Coal Co., of New Glasgow, N. S., has received an order for 12,000 tons of steel for the new Halifax terminals and a large order from the Canadian Northern railway for spikes, bolts, angle bars, etc.

The National Steel Car Co., of Hamilton, has recently received large orders for rolling stock which will necessitate the extension of its plant and the taking on in the near future of 400 or 500 more men. Owing to the number of passenger cars required, a contract has been let to the Hamilton Bridge Co. for a considerable addition to the passenger car shop, the erection of which will be proceeded with at once. This will enable the company to lay down 30 passenger cars at one time, giving it a capacity of 150 passenger cars per year in addition to the street car output.

The Berg Machinery Mfg. Co. of Toronto, engaged in the manufacture of brick and general machinery, engines and boilers has been assigned to J. P. Langley.

Greatest Need of the World Today

(*Continued from page* 197.)

to oppose policies with which they do not agree. Employers are coerced into agreements which they deem unjust and onerous.

"That, in my judgment," said Mr. Taylor, "is un-American and wrong."

Mr. Taylor criticized courts for being amenable to influence from organized labor and claimed employers have been on the defensive in the courts for years. He would have labor unions made financially responsible by being incorporated. "When you have them responsible," he continued, "you should have a tribunal which would have power to enforce justice, with judges appointed for life."

The commission, spurred on by charges of blackmailing on the part of business agents of unions in Chicago, questioned many witnesses along that line. Not only were labor representatives asked as to the action of their organizations in case grafting is proved, but representatives of employers were asked as to the action of their organizations when members paid blackmail and were discovered, evidently taking the ground one act is as reprehensible as the other.

Little Grafting Found.

John Fitzpatrick, president of the Chicago Federation of Labor, commenting on this feature, claimed labor organizations eradicate it wherever it is discovered.

"For instance," said he, "there are 260 organizations affiliated with the Chicago federation. Each has nine to eleven officers. Five or six organizations have been found after careful research where claims of blackmail have been made. Among these are three or four free-lance, irresponsible organizations.

"Yet what they do is charged up to organized labor. Out of thousands of officials, half a dozen have been found who can be charged with this sort of crooked work."

Samuel Insull, head of many utilities concerns, employing about 18,000 men, takes the position that labor should not be organized in public utility enterprises.

"In case of a strike the operation of transportation would cease; the wheels of industry would stop; the public would suffer. Our function is a semi-governmental function."

"Does organization lead to more strikes?" he was asked.

"Well, the best evidence in our case," was the reply, "is that we are not troubled by strikes. We have never had any serious trouble in dealing with our mechanical forces."

Objections to labor unions brought out by various witnesses include the following: Grafting, blackmailing, violence in strikes, limitation of output, breaking of agreements, disloyalty to the state in keeping members out of the militia, jurisdictional disputes injuring innocent employers, strong unions dictate harsh terms, unions are financially irresponsible.

As these points have been developed the commission has asked witnesses categorically to answer as to whether in their experience these factors have been active.

Diverse Views on Unions and Collective Bargaining

By Mr. Insull—Brains need no collective bargaining. Some classes of labor are better off with collective bargaining, others are better off without it. I believe men above the average intelligence do not need it; those below do.

By Mr. Fitzpatrick—The unrest is created by the grip of big business, which is never relaxed. The workers of the world have always been oppressed and have found ways of getting relief. Collective bargaining is the agency.

By Mr. Glenn—Labor Unions are the enemies of civilization. The unions and the church cannot exist together.

By Mr. Diebler—Collective bargaining is necessary to protect the interests of the employe.

By Miss McDowell—Some unions are aristocratic. They limit membership and charge enormous initiation fees. We cannot get along without collective bargaining, but industry needs to be democratized.

John M. Glenn, secretary of the Illinois Manufacturers Association, roused the ire of Chairman Walsh when he stated the movement for the bill creating the commission was started by people interested in stirring up differences between capital and labor. Chairman Walsh immediately asked the witness to name those to whom he referred and Mr. Glenn mentioned William T. Devine, of New York, Washington Gladden, of Ohio, and Jane Addams, of Illinois.

"We have conducted this investigation up to the present time without indulging in personalities," said Chairman Walsh. "We will not begin doing it now. Please confine yourself to a direct reply to the question propounded by counsel."

President O'Donnell, of the Building Trades Council, and Charles W. Gindele, president of the Building Construction Employers' Association, organizations representing opposing interests in the building trades in this city, found almost common ground in regard to settlement of disputes over differences of opinion.

Mr. Gindele said: "Every union in Chicago should affiliate with a central organization and have agreements with employers covering the entire industry. That would do away with business agents, who have too much authority. Unions should be incorporated and a penalty should be attached for calling strikes without just cause. The unrest in Chicago is caused by the labor leaders and business agents."

Mr. O'Donnell stated that some years ago many strikes were caused by jurisdictional disputes between unions as to which one should do a particular piece of work. These have been done away with, he said, by the adoption of an agreement with contractors calling for arbitration of all disputes. He believes the way to end strikes is by agreements and stated his organization is seeking to conclude such an agreement now to cover all disputes.

Wants Permanent Court.

President George M. Reynolds, of the Continental and Commercial National Bank, testified he favors arbitration of disputes and a permanent court for general supervision of industrial affairs.

John G. Shedd, president of Marshall Field & Co., drygoods dealers, gave a new idea on profit sharing. He deems unfair a profit-sharing plan that gives a division of profits in successful years but does not also carry responsibility for the unsuccessful years. As applied to the business in which he is engaged, Mr. Shedd is opposed to a pension system as tending to decrease thrift and create a general air of dependence.

Representative People Heard.

Other witnesses examined were Charles Piez, Illinois Manufacturers' Association; Victor A. Olander, International Seamen's Union; Miss Mary E. McDowell, University of Chicago settlement; Julius Rosenwald, president Sears, Roebuck & Co.; James Mullenbach, superintendent Oak Forest Infirmary; Prof. Graham Taylor, Chicago Commons; Charles W. Gindele, president Building Construction

Employers' Association; E. M. Craig, secretary Building Construction Employers' Association; John A. Metz, president Carpenters' District Council; F. S. Deibler, chairman City Club committee on labor conditions; Charles W. Fry, International Association of Machinists; Miss Agnes Nestor, president Women's Trade Union League, of Chicago; Miss Grace Abbott, director Immigrants' Protective League; Dr. Theodore B. Sachs, president Chicago Tuberculosis Institute; T. E. Donnelly, of R. R. Donnelly & Sons; Edwin R. Wright, president Typographical Union No. 16; Frank C. Caldwell, H. W. Caldwell & Sons Co.; George W. Perkins, president Cigarmakers' International Union.

Large Royalty

On Mining Property in the Cuyuna Range

Brainerd, Minn., July 27.—Independent eastern men have leased the Iron Mountain Mining Co. property on the north range, paying an advance cash royalty of $50,000, and 75 cents a ton, being the largest advance royalty ever paid on any property in the Lake Superior district. Rich in manganiferous ores, the new company expects to strip its holdings and make it a pit mine.

The Jones & Laughlin Steel Co. is to commence the stripping of the Feigh property in section 9, township 46, range 29, and the location has already been surveyed.

A company is being organized by Fred Baxter and James Ducey, of Superior, Wis., to put down a shaft nearby in the same section.

The Duluth-Brainerd mine, whose shaft was sunk in the record time of 60 days, has reached the ore body after drifting 125 feet. The ore is a hard manganiferous ore of a blue steel color and resembles closely the best grades of ore of the Cuyuna-Mille Lacs mine.

Shipping from their shafts are the underground mines of the Cuyuna-Mille Lacs, Cuyuna-Duluth, Armour No. 2, the Kennedy and the pit mines now shipping are the Rowe pit at Riverton and the Pennington, near Crosby and Ironton. The Adams mine at Oreland is stockpiling. The Duluth-Brainerd is drifting in the ore body. Engaged in shaft work are the Wilcox mine, at Woodrow, and the Brainerd-Cuyuna mine, at Brainerd. The Croft mine of the Merrimac Mining Co., at Crosby, has put up office and mine buildings, but has as yet commenced no shaft sinking.

Manganiferous iron ores are causing renewed interest in the Cuyuna iron range and properties showing the ore are being eagerly leased, bought up and worked.

Stop Watch

Excluded from Government Arsenals by House Bill

Washington, July 28.—Following an investigation, the House committee of labor has prepared a bill prohibiting the use of the stop watch system in government arsenals. A fine of $500 and a jail sentence are provided for the checking up of the work of an employe through the use of a stop watch or any other device. The finding of the committee, which acted unanimously, is in line with the demands of organized labor.

Scientific shop management, such as is provided by the Taylor system, is condemned by the committee as being extreme in its demands upon workmen, the contention being that it drives them at their utmost speed and is physically exhausting. Gen. Crozier, chief of the ordinance of the army, submitted testimony before the committee showing that the system has no such effects whatever, but on the contrary is moderate in its demands on labor, and assures good wages to employes, as well as good services to employers.

Start Work on New Sheet Plant

The Western Reserve Steel Co., which has a new sheet mill under construction at Warren, O., recently has placed the following contracts: Buildings, the Riter-Conley Mfg. Co., Pittsburgh; mills and shears, the Hyde Park Foundry & Machine Co., Hyde Park, Pa.; 1,600-horsepower mill motor for driving the main mill train, the Westinghouse Electric & Mfg. Co., East Pittsburgh. In connection with this installation, the Western Reserve Steel Co. has placed an order for a large gear drive with the William Tod Co., Youngstown, O. Erectors from the Riter-Conley Mfg. Co. are at Warren and expect to begin the construction of the buildings within a few days.

The American Seeding Machine Co., Springfield, O., has declared a quarterly dividend of 1½ per cent on its preferred and 1 per cent on its common stock.

New Plant at Farrell.—The Carnegie Steel Co. has placed with Bagley, Mills & Co., 50 Church street, New York City, American representatives of Messrs. Carl Still of Recklinghausen, Germany, a contract for the construction of a benzol plant at Farrell, Pa. This plant is to be built in pursuance of the policy of the Steel Corporation further to develop the utilization of the by-products of manufacture. The Carl Still type of benzol recovering and refining plant marks a new departure in the recovery of by-products in conjunction with coke manufacture in this country.

Receives Ore Dock Contract

Henry Steers, Inc., New York, has received the contract for the erection of the new iron ore dock to be built at Constable Hook, N. J., in New York harbor, by the Lehigh Valley railroad for the accommodation of the shipments of Chilean ore by the Bethlehem Steel Co., and of cargoes from other foreign countries consigned to eastern Pennsylvania blast furnaces. Previous reference has been made in THE IRON TRADE REVIEW to the plans and purposes of the proposed dock. The dock is to be built of concrete and timber.

The Bethlehem Steel Co. will manufacture and furnish the unloading machinery. The work of dredging and excavating the site is being done by Breyman Bros., of Boston, and this now is in progress.

Boiler Makers' Convention

The American Boiler Manufacturers' Association will hold its twenty-sixth annual convention in New York City, Sept. 1 to 4, inclusive, with headquarters at the Waldorf-Astoria hotel. All boiler, tank and stack manufacturers and fabricators of steel plate, also manufacturers and representatives of materials and supplies used by boiler manufacturers are invited to attend the convention.

A number of interesting papers on subjects of importance to boiler and plate manufacturers will be read. The subject of uniform boiler specifications will be thoroughly discussed, and it is hoped that some action on this subject will be taken.

If those expecting to attend will send their names to F. B. Slocum, secretary, West and Calyer streets, Brooklyn, N. Y., arrangements for locating them during the convention will be made.

After a suspension of two weeks, the Pine Iron Works, Berks county, Pa., has resumed operations.

Ten Dollars

Below Price of American Makers In German Quotations

New York, July 28.—German makers of cold rolled strip steel have been marketing some tonnage of their product at tidewater and nearby points at prices greatly below those quoted by the domestic producer. A Brooklyn manufacturer recently has brought in about 1,000 tons of this material, which was obtained at a price reported to have been $10 a ton below the delivered figure quoted by home makers. The labor item in the manufacture of this material is large. The ocean freight rate in this case was less from Germany than the rail haul from Pittsburgh. German makers also have been selling some lots of galvanized wire in eastern territory at about $10 a ton below the market of home manufacturers.

Will Sell Rolls

It is officially announced that the Pittsburgh Iron & Steel Foundries Co., Midland, Pa., has licensed the United Engineering & Foundry Co., Pittsburgh, to manufacture and sell "Adamite" rolls, patents on which have been controlled for several years by the former company, although the Pittsburgh Iron & Steel Foundry Co. will continue the manufacture and the sale of the rolls as heretofore. The company recently has made a number of improvements to its plant at Midland, including the installation of a 35-ton open-hearth steel furnace, which doubles the size of the open-hearth department.

Enjoying Good Business

Chilton, Wis., July 27.—To meet an unexpectedly large run of orders for small gasoline engines from the southwest and eastern states, the Steiner Mfg. Co. of Chilton, Wis., has been obliged to put on a night shift and add about 50 more skilled workmen. The concern reports that business has been very good throughout the first half of 1914, but since July 1 the increase has been very decided. This is attributed to the glowing crop reports from all parts of the country. The Steiner business is principally farm engines.

Doubled Forces

Milwaukee, July 28.—The Milwaukee Malleable & Gray Iron Co., and the Milwaukee Hay Tool Co., allied corporations with works in Layton park, Milwaukee, have added about 250 men, doubling the respective forces, and resumed better than normal operations as the result of the heavy demand for agricultural implements following the certainty of bumper crops all over the United States. The foundry company has lighted another furnace and is running full time, while the hay tool works have manned every machine and tool so as to be able to cope with the orders coming in at this time. Both plants are preparing for a heavy run throughout the fall and winter to fill orders from jobbers.

Visiting Springfield Plants

Much enthusiasm is being aroused among the citizens of Springfield, Mo., by the "See Springfield First" movement, fostered by the Springfield Club. Tours of inspection of the manufacturing plants of the city are being made and manufacturing concerns are contributing to the exhibits at the Springfield Club of products manufactured in that city. H. T. Hornsby, vice president and general manager of the United Iron Works Co., recently placed among the exhibits a tiny refrigerating machine, and when the plant of the United Iron Works Co. was visited, much interest was expressed in seeing the refrigerating machinery and other products which are turned out by that company. The United Iron Works Co. has found a wide field for its products.

Form New Foundry Co.

The Wilson Foundry & Machine Co., Pontiac, Mich., incorporated at $400,000, has rehabilitated the old foundry of the Flanders Mfg. Co., and is prepared to operate. The company is organized as follows: President and general manager, Charles B. Wilson, formerly general manager of the Ferro Machine & Foundry Co., Hubbard avenue and East Sixty-sixth street S. E., Cleveland; vice president and sales manager, D. R. Wilson, also of the Ferro Machine company; secretary and treasurer, C. E. Killinger. A. Weber will be foundry superintendent. William Short, chemist, and C. Fleming, master mechanic. Part of the staff will be brought from Cleveland. The company will do general gray iron casting, specializing in automobile cylinders. Floor area is 75,000 square feet and capacity 40 to 50 tons daily.

The Columbus Heating and Ventilating Co., Columbus, O., has been awarded the contract for the heating and ventilating equipment for the new Ashland, O., high school. The contract price is $11,000.

Death of Dr. John Galbraith

The death of Dr. John Galbraith, dean of the faculty of applied science of Toronto University, occurred July 22, from heart failure, at his summer residence, Go-Home Bay in the Georgian Bay district. He was born in Montreal in 1846 and graduated at Toronto University with high honors in 1868. He was engaged for some years in railroad work and in 1878 became principal and professor of engineering in the Ontario School of Practical Science, of which he was virtually the founder. Mainly owing to Dr. Galbraith's labors, it expanded from very small beginnings to an engineering college equal to any in the dominion. It was subsequently affiliated with the University, Dr. Galbraith becoming dean of the faculty of Applied Science. He was vice president of the engineering sections of both the British and American Associations for the Advancement of Science. Dr. Galbraith was one of the founders of the Canadian Society of Civil Engineers of which he was elected president in 1909. He was one of the three commissioners appointed to investigate the collapse of the Quebec Railway bridge, a work which occupied about ten months. The esteem in which he was held was strikingly manifested last December when on the occasion of a dinner given in his honor to celebrate the 35th anniversary of the School of Practical Science a large number of prominent engineers from all parts of the continent united in paying a tribute to his services to the cause of scientific education. He is survived by a widow, two sons and a daughter.

J. Wheeler Hardley, of Brooklyn, N. Y., prominently identified with the lake copper industry for the past quarter of a century, died on July 21 in New York at the age of 66.

John Thompson, plowmaker at Beloit, Wis., since 1850, head of the John Thompson & Sons Mfg. Co., died July 24. He was born in Norway and had retired from active business ten years ago. He started his business by making plows by hand.

Edward B. Colby, president of E. B. Colby & Co., Jersey City, N. J., stove manufacturers, died at a hospital in Jersey City, July 20, following a stroke of apoplexy. Mr. Colby was stricken in his office a few hours before. He was 58 years of age. He was a resident of Montclair, N. J.

Employes of the Westinghouse Air Brake Co., Pittsburgh, enjoyed their eighth annual outing at Idlewood Park, near Ligonier, Pa., July 25.

TIPS FOR NEW BUSINESS

Equipment needs of the Iron and Steel works, Machine shops, Foundries and other Metal Working plants

In New York, a large order for special machinery has been placed by one of the trunk line railroads. There is a fairly good volume of small orders, but only a few important orders have been placed lately. One large order not previously reported is that placed by the Pierce Arrow Motor Car Co., Buffalo. This went almost entirely to the Prentiss Tool & Supply Co., New York. Some more machinery for use in connection with the Cohoes project has been ordered. The Interborough Rapid Transit Co. has ordered a large crane, having capacity of 80 tons. J. S. Mundy, hoisting engine manufacturer, who is building a new plant in Newark, has closed for a crane, and a few other small orders for cranes have been placed. The city of Newark is closing this week on a lathe for the Central High School and three lathes, a milling machine and a grinder for the Boys' Industrial School. A few good orders for machinery for export have been booked by New York houses during the past week or 10 days; on the whole, however, the foreign demand has been showing up rather poorly recently. Demand for second-hand machinery continues fair.

In Pittsburgh, machine tool dealers report no change in the situation, although representatives of eastern firms have been receiving more favorable accounts of business conditions from the home offices, and expressions are heard that the local market will be looking upward shortly. Builders of heavy rolling mill equipment and power plant equipment continue to enjoy a fairly satisfactory run of business.

Chicago dealers in machine tools are watching closely for signs of improved demands and in some instances have found them. As a rule, however, no great change has come about and such goods as are moving are single tools to eke out a pressing need here and there. No particular line is represented strongly and the only feature presented is the variety of industries represented.

EASTERN STATES

PORTLAND, ME.—Bancroft & Martin are installing a new 8-inch mill which will be in operation about Sept. 1 and increase the capacity of the plant about 15 per cent.

LYNN, MASS.—J. D. Smith, mirror manufacturer, will erect a $4,500 brick building in the rear of 33 Jackson street; Davis, Haines & Davis, contractors.

WORCESTER, MASS.—The Wright Wire Co. will erect a 3-story addition to its plant; E. D. Ward, 32 Foster street, contractor.

WORCESTER, MASS. — The Worcester Strip Steel Mill Co. has been incorporated to manufacture cold rolled steel; $50,000; by John W. Higgins, president and treasurer; Henry J. Williams, vice president and Arthur P. Higgins, the third director. The company will be a subsidiary of the Worcester Pressed Steel Co. which will use about half its output. Buildings are already constructed and machinery will be ordered from Germany and Pittsburgh.

WORCESTER, MASS.—The old Wheeler foundry, 138 Mechanic street, one of the landmarks of the city, has been closed permanently, in order that the plant may be razed to make room for real estate improvements. The owners of the old foundry are planning the erection of a modern plant on some other site and it is reported that an option has been taken on the property of the Webb Granite & Construction Co., Crescent street, Worcester. The head of the foundry company is Mrs. Minerva L. Pierce, and the treasurer, Jas. Warren.

NEW BRITAIN, CONN.—The Stanley Works, hardware, will erect a 7-story building in the west yards; contract to build awarded to Aberthaw Construction Co., of Boston, at about $100,000.

SOUTHINGTON, CONN.—The Aetna Nut Co. has awarded contract for 35 x 45 foot addition to John W. Francis.

PROVIDENCE, R. I.—The James H. Tower Iron Works has been incorporated; $100,000; by James H. Tower, Clifford S. Tower, Louis P. Tower, Benjamin P. Harris.

BUFFALO.—The Taber Pump Co. plans a 2-story brick addition with a 1-story saw-tooth roofed machine shop, 15,000 square feet of floor space; plant to be equipped with block flooring and a mono-rail system for handling materials and parts; estimated cost, $65,000.

BINGHAMTON, N. Y.—The Indian Refining Co. will erect a building, storage tanks and install a tank wagon system here in the near future; estimated cost, $50,000.

BINGHAMTON, N. Y.—Clayton, W., Harry N. and Jess C. Hull, of this city, have filed a certificate to the effect that they will conduct a sheet metal works here under the name of Clayton W. Hull & Sons.

BROOKLYN.—The Ford Motor Co. has purchased 44 x 100-foot site and will erect a 6-story, brick and steel building to be used as a salesroom and service station.

LONG ISLAND CITY, N. Y.—Mrs. Annie S. Anable has filed plans for a large factory building to cover the block between Seventh and Eighth avenues on Webster avenue; Phoenix Concrete & Steel Co., builder; Concrete-Steel Co., engineer; Henry J. Howitz, architect.

NEW YORK CITY. — The Turner Construction Co. has the general contract for a 10-story and basement reinforced concrete factory building for the L. E. Waterman Co. on Front street near Fletcher street; Ludlow & Peabody, architects.

SYRACUSE, N. Y.—Gooley & Edlund, manufacturers of milling machines and small tools, have awarded contract for manufacturing plant to Stafford & Humphries, of McGraw.

TROY, N Y.—James Hislop, owner of the Reynolds-Chalou foundry on Second street, is having extensive improvements made, including a spur track.

GARLAND, PA.—The Automatic Gas Shutoff Valve Co. is erecting a one-story, 60 x 130-foot brick factory building.

NEW CASTLE, PA.—County commissioners expect plans for Grant street bridge within the next 10 days; bids will be asked at once.

PHILADELPHIA. — Harry Burstein is planning to have a 6-story, 26 x 60-foot, reinforced concrete factory building erected at 709 Filbert street.

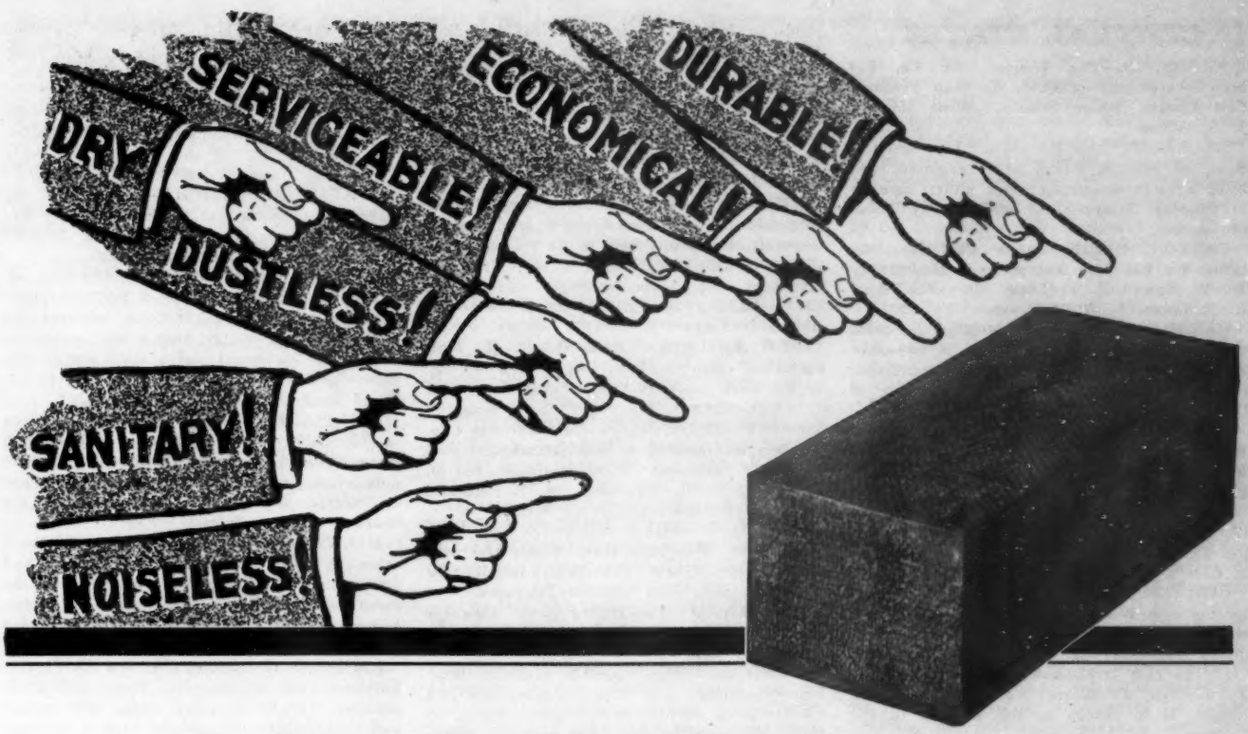
POTTSVILLE, PA.—Pennsylvania railroad has permission to build a bridge over Schuylkill river here.

BURLINGTON, N. J.—Daniel I. Brown will erect a 1-story, 30 x 40-foot foundry for brass, aluminum and gray iron.

DOVER, N. J.—After a conference with the town council, the Richardson & Boynton Co. has announced that it will rebuild the plant which recently was destroyed by fire. Contract for the steel for the new plant already has been let to the Lackawanna Steel Co. and the new buildings will be fireproof. They are to include a foundry 140 x 448 feet; cleaning and pattern shop, 60 x 300 feet; machine, testing and mounting shop, 100 x 300 feet. The plant probably will be completed in about four months and in the meantime the company will endeavor to fill orders by means of the small foundry that remained after the conflagration. A great deal of special machinery for use in assembling all kinds of stoves, boilers and ranges, which was destroyed in the fire, is to be replaced by new machines. The new plant is to be provided with ample fire protection in the form of a main from the Dover pumping station, by means of which water pressure of 500 pounds will be available at the plant.

NEWARK, N. J.—Boerger-Meyer Machine & Tool Co. has been incorporated; machinery and tools; $25,000; by G. H. Boeger, E. L. Meyer and W. G. Eger, city.

NEWARK, N. J.—The Balbach Smelting & Refining Co. has been granted a permit to erect a new furnace building and a structure for housing blowers and motors at its Meadow plant, avenue R and Doremus avenue. The former building will be 76 x 93 feet, one story, and the other 36 x 54 feet, one story.



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KANSAS CITY, MO.—1117 Rialto Bldg. MEMPHIS, TENN.—1402 Exchange Bldg.
PHILADELPHIA, PA.—319 Perry Bldg.

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WOOD BLOCKS

CENTRAL STATES

AKRON, O.—The Wedge Core Co. has been incorporated; $10,000; by John Yemiker, Carl Looker, Elmer Schultz, Albert Haeffer, J. S. Adams.

BELLAIRE, O.—The Wm. Lipphardt & Sons, of Martins Ferry, it is reported, will build a large enameling plant either here or in Martins Ferry; plant will employ about 400 women.

CANTON, O.—The Armor Clad Manufacturing Co. has been incorporated; $50,000; by W. W. Sproul, S. F. Long, Mary G. Beiter, R. T. Green, F. A. McGowan.

CANTON, O.—Union Metal Mfg. Co. plans to start construction Aug. 1 on a two-story 70 x 250-foot brick plant which will quadruple its capacity according to the statement of C. C. Barrick, president.

CHILLICOTHE, O.—Scioto Valley traction line will replace the wooden trestle here with concrete abutments and piers with steel girders; estimated cost $75,000.

CINCINNATI.—The Central Iron & Steel Co. has taken out a building permit for making $3,900 worth of alterations to its factory at Carr and Sargent streets.

CINCINNATI.—Plans and specifications for the new Woman's Building at the University of Cincinnati, Cincinnati, will be furnished and bids will be received about Aug. 17. The cost is estimated at about $150,000. A. Lincoln Fechheimer, architect, of Cincinnati, is in charge of the erection of the building.

CINCINNATI.—Bids for the rebuilding of the Norwood water works, Norwood, suburb of Cincinnati, will be received until Aug. 7. The building will cost about $62,000, and the equipment required will include two boilers, an air compressor, two engines, two generators, switchboard, and a water softening plant. Gustave Drach, architect, and Walter Franz, consulting engineer, both of Cincinnati, are in charge of construction.

CLEVELAND.—The Fireproof Building Co. will have a $50,000 building erected at 634-44 Huron road.

CLEVELAND.—The East Ohio Gas Co. plans to erect a $600,000 building at the corner of East Sixth street.

CLEVELAND. — The Gustav Schaefer Wagon Co. will double its capacity by erecting an addition to its plant at 4166-4200 Lorain avenue; estimated cost, $40,000.

CLEVELAND.—The Ferry Cap & Set Screw Co. has obtained a permit to erect a 3-story 40 x 176-foot brick addition to its plant at 2152 Scranton road S. W.

CLEVELAND.—Directors of the Cleveland Railway Co. have approved the purchase of 100 side entrance cars; estimated cost, $600,000. They also approved plans to build an operating plant at Superior avenue and East 123rd street to cost about $150,000.

CLEVELAND.—Bids will be received until noon Aug. 18, at 513 the City Hall, for materials for the proposed city hall building including ornamental iron and bronze work, sheet metal work, heating and ventilating, plumbing and gas fitting, vacuum cleaning, elevators, pneumatic tube service, electric wiring, motor generator sets, vaults, etc.; specifications on file at the office of the director of public service, and at the office of the architect, J. Milton Dyer.

CLEVELAND.—McClintic-Marshall Co. has the contract for a one-story 50 x 100-foot brick and reinforced concrete power house for Parish & Bingham Co., Madison and West 106th street. The company does steel stamping and auto frame construction and has under way a $140,000 main building and a $25,000 office building.

COLUMBUS, O.—The Pittsburgh, Cincinnati, Chicago & St. Louis railroad has been authorized to issue $3,500,000 consolidated bonds to be used in improvements including a $160,000 bridge at Coshocton, $19,000 bridge at Greenville and a $53,000 bridge at New Paris.

KNOXVILLE, TENN.—The Appalachian Mills Co. is erecting two buildings costing about $50,000; when completed, $100,000 worth of machinery will be installed.

MINGO, O.—Martins Ferry capital has purchased several acres for a steel ceiling manufacturing plant; bids to be let shortly.

NEW PHILADELPHIA, O.—J. C. Rath, aluminum and brass castings manufacturer has a building nearly completed; plant will employ 40 men.

NEW PHILADELPHIA, O.—R. H. Nussendorfer, county auditor, will open bids Aug. 17 for steel superstructure, 77 feet long with a 15-foot roadway, for Sugar Creek bridge.

PAINESVILLE, O.—Vulcan Carriage Co. has ben incorporated to manufacture and deal in motor vehicles; $1,000,000; by E. D. Heartwell, E. E. Lawrence, F. H. Murray, Harry E. Hammar, and J. C. Ward.

SALEM, O.—W. J. Clark Co. has purchased the Woodruff stove plant and will transfer its present equipment, install new machinery and make necessary changes.

WARREN, O.—The United States Insulator Co., incorporated for $450,000, will start to erect a factory building this week.

WEST ELKTON, O.—The Talbert Bros. Co. will rebuild and equip its woodwork and blacksmithing departments, which were recently destroyed by fire. The company manufactures buggies and wagons.

XENIA, O.—Xenia Rubber Co. will erect a two-story 50 x 100-foot factory of concrete and steel; sides principally of steel and glass.

FAIRMONT, W. VA.—The Monongahela Valley Traction Co. will abandon its $300,000 power plant here and build a gas engine plant at Hutchinson, W. Va.

LEXINGTON, KY.—Extensive improvements will be made by the Louisville & Nashville Railway in increasing the terminals, building a machine shop, etc.

LEXINGTON, KY.—The Forman-Earl Co., lumberman, will build a 25-mile standard gage railway from Ida May, on the L. & N., to Buffalo, Owsley county, passing through Lee county.

LOUISVILLE, KY.—The Axton-Fisher Tobacco Co. is letting contracts for the extension of its plant, but the power equipment, which will be electrical, will come later. A dynamo, several motors ranging from 5 to 30 horsepower and a freight elevator will be among the equipment which will be purchased.

LUDLOW, KY.—Queen & Crescent railroad has purchased a city block and will spend $100,000 in erecting shops and necessary additions.

TIPTON, IND.—McEntee Plow Co. has been incorporated with $200,000 capital to build, equip and operate a plant for manufacturing plow points.

AMBOY, ILL.—The Lee County Central Electric Railway Co. has been incorporated to construct and operate an electric line from this place to Rochelle, Ogle county; Ashton, Lee county, to Kalb, De Kalb county, and from Dixon, Lee county, to Mendoat, La Salle county, and Princeton, Bureau county; $250,000; by Sherman L. Shaw, Elijah King, Henry W. Hillison, Andrew Aschenbrenner and Alfred H. Nichols.

CHICAGO.—Bulley & Andrews, 25 North Dearborn street, have the general contract for a hospital building at 5046 Vincennes avenue, reinforced concrete, five stories, 96 x 152 feet.

CHICAGO.—H. Eilenberger, 122 South Michigan avenue, has the general contract for a mercantile building on Wabash avenue near Congress street, reinforced concrete, seven stories, 70 x 170 feet.

METROPOLIS, ILL.—Work on the proposed $2,000,000 railroad bridge to be erected here will start soon; Union Bridge & Construction Co., Kansas City, engineer.

PLANO, ILL.—Illinois Metal Co. has been incorporated to manufacture metal specialties; $20,000; by George E. Mueller, James G. Kellogg, James P. Burke.

PORT HURON, MICH.—The plant of the Havers Automobile Co. was destroyed by fire on July 7, causing a loss of about $75,000. The origin of the fire is unknown.

BELOIT, WIS.—The board of school directors has decided to erect a fireproof building, 32 x 39 x 15 feet, to be used for manual training at the high school and is in the market for forges and a small list of machines and tools, electrically driven. H. E. Wood is director of the department.

MIILWAUKEE. — A $150,000 addition to Third Ward School, Detroit and Jackson streets, to contain the Third Ward public natatorium, manual training shops, etc., will be erected at once under direction of the board of school directors.

MILWAUKEE. — Bids are now being taken by Louis G. Widule, county clerk, and Leenhouts & Guthrie, architects, for the construction of the new $600,000 Milwaukee county house of correction. The plans call for three machine shop buildings, with full machine and tool equipment, and nine other buildings, all of concrete, steel and brick, exclusive of a steam power plant, cold storage and refrigerator buildings. Contracts for erection work will be awarded about Aug. 10. Previously noted.

PLYMOUTH, WIS.—The Plymouth Furniture Co. is increasing its power plant capacity and has purchased a 150-horsepower horizontal water tube boiler from the Optenberg Iron Works, Sheboygan, Wis.

KANSAS CITY, MO.—Swenson Construction Co., 625 Finance building, has the general contract for a loft building of reinforced concrete, 12 stories, 102 x 166 feet.

PALMYRA, MO.—Howard J. Smith is in charge of $26,000 bonds for extending the water system and electric light plant.

DES MOINES, IA.—The Green Foundry & Furnace Works has purchased three blocks in East boulevard as a site for its proposed large foundry to be erected in about 18 months. It has already outgrown present quarters.

KEOKUK, IA. — The Johnson Electric Smelting Co., of New York, will erect a $75,000 plant and building here at once.

ST. PAUL.—The Northern Pacific railroad will receive bids immediately for a roundhouse and locomotive repair plant to cost approximately $500,000.

VIRGINIA, MINN.—The Cleveland Construction Co., 606 Citizens building, Cleveland, Ohio, has the general contract for a power house addition for the Mesaba Railway Co., to cost $150,000.

SOUTHERN STATES

ATLANTA, GA.—The Southern Wire & Iron Co. plans to erect a 3-story building at 36 Martin street.

AUGUSTA, GA.—Swift & Co. will erect $300,000 cotton oil mill and fertilizing factory in the early fall; cotton mill will accommodate six oil presses. The plant will be electrically driven and a 500-horsepower generator will be installed.

MACON, GA.—The Willingham Cotton Mills Corporation will erect an addition to accommodate about 6,000 spindles.

CHATTANOOGA, TENN.—The Queen & Crescent Route plans $500,000 improvements for the Chattanooga terminals of the Cincinnati, New Orleans & Texas Pacific and Alabama Great Southern railway; including $250,000 freight warehouse and terminal

offices. Switching yards will cover more than 70 acres near here.

MEMPHIS, TENN.—The Yazoo & Mississippi Valley railroad will establish car building and locomotive repair shops to employ about 4,000 men at Nonconnah, just below New South Memphis, where it will also establish shops. The Illinois Central system is doing some double tracking in this district, straightening curves and eliminating grades.

WESTERN STATES

KANSAS CITY, KAS.—Citizens will vote Aug. 25 on a $200,000 bond issue for extending the municipal water system; George Little, city clerk.

LEWISTON, MONT.—Contract for the steel bridge over Sage Creek has been awarded to the Security Bridge company at $8,000.

ELLENSBURG, WASH.—An ordinance is under way calling for an auxiliary steam pumping plant at the municipal wells; cost not to exceed $5,000.

REPUBLIC, WASH.—Mahlon McClain and Fred M. Shields have been granted a 50-year franchise to construct and maintain electric power and transmission lines on all the roads of the county. Construction will be started shortly and 30 miles of line from this place to Danville will be completed in six months.

SEATTLE, WASH.—Port commission will receive bids until Aug. 20 for the proposed $250,000 grain elevator for which Chief Engineer Paul P. Whitman has submitted complete plans.

SEATTLE, WASH.—The war department has rejected all bids for installing electrical equipment and operating machinery in the locks of Lake Washington canal and new bids will be received by Major J. B. Cavanaugh, Burke building, Aug. 10; specifications now ready for bidders; approximate cost of work, $150,000.

OREGON CITY, ORE. — A. U. Berry, Selling building, Portland, has been awarded the contract by Clackamas county for the construction of two steel bridges at $21,247.

PORTLAND, ORE.—The Pacific Iron Works, O. E. Heintz manager, has just completed plans for its proposed shops to be erected at Twenty-ninth and Halsey streets; bids will be asked soon.

PORTLAND, ORE.—The Manufacturers' Association of Oregon announces that the Electrolitic Gas Co., of Dayton, O., has decided to locate here and will manufacture oxygen and hydrogen to supply the local market; plans have been prepared for and work will start soon on the proposed plant to be erected at Center and Seventeenth streets; E. A. Finkenbeiner will be local manager.

ROSEBURG, ORE. — At the regular October election, citizens will vote on a $300,000 bond issue for a steam railroad between this place and the coast.

LOS ANGELES, CALIF.—Western Safety Tire Co. has been incorporated; $100,000; by George Hodel, Samuel B. Dannis, J. H. Grube, B. H. Reeher and Paul Soroker.

CANADA

GREENWOOD, B. C.—The White Pine Lumber Co., of Spokane. will erect a sawmill with a 24-hours capacity of 200,000 feet about 30 miles from here at Westbridge.

VANCOUVER, B. C.—Ralph Modjeska of Chicago has been selected as engineer to report on the plans which have been submitted for the Second Narrows Bridge here.

TRADE NOTES

BEAVER DAM, WIS.—Formal organization of the Western Malleables Co., Beaver Dam, Wis., has been completed with the election of the following officers: President and treasurer, Lawrence Fitch, Milwaukee; vice president and general manager, Ernest E. Smythe, Milwaukee; secretary, M. A. Jacobs, Beaver Dam. Mr. Fitch was vice president and Mr. Jacobs treasurer of the bankrupt Beaver Dam Malleable Iron Co., the assets of which were purchased by Mr. Fitch and associates. Mr. Smythe has been in charge of the four plants in Beaver Dam as operating receiver and later as manager for the purchasers. The three officers form the directorate, to which two additional members will be elected late this week.

CAMBRIDGE, MASS.—The G. H. Dyer Co., of Boston, manufacturers of welding outfits, are moving into a new shop recently erected at Brooklyn and Valentine streets, Cambridge. The new plant is a one-story brick, 35 x 102 feet.

CINCINNATI.—Hilb & Bauer, iron and steel scrap dealers, Cincinnati, with a plant on Mill street, that city, will establish a central office in the down town business district, having leased a suite in the Union Trust building.

CLEVELAND.—Among recent orders received by The Bruce-Macbeth Engine Co., Cleveland, for Bruce-Macbeth multi-cylinder gas engines, are the following: Ambridge Water Works, Ambridge Pa., one 125-horsepower four-cylinder natural gas engine; Swarthmore College, Swarthmore, Pa., one 40-horsepower twin-cylinder artificial gas engine; The Magnolia Petroleum Co., Hodge, Texas, two 150-horsepower four-cylinder natural gas engine; Washington University, St. Louis, Mo., one 40-horsepower artificial gas engine; Wm. Chisholm & Sons Co., Cleveland, one 150-horsepower natural gas engine; Jeanette Glass Co., Jeanette, Pa., one 125-horsepower natural gas engine; James Hodgkin, East Youngstown, O., one 40-horsepower natural gas engine; Ohio State Reformatory, Mansfield, O., one 40-horsepower natural gas engine; C. F. Jackson Co., Findlay, O., one 90-horsepower natural gas engine; Northside Cameraphone Theatre, Pittsburgh, two 70 horsepower natural gas engines.

NEW CATALOGS

AIR COMPRESSORS.—A 16-page bulletin issued by the Chicago Pneumatic Tool Co., Chicago, is devoted to its line of steam and power-driven, enclosed air compressors. Various types are illustrated and described and numerous applications are shown.

CUTTING AND THREADING PIPE.—The Curtis & Curtis Co., Bridgeport, Conn., in a circular recently issued, illustrates and briefly describes pipe cutting and threading machines. By the use of Forbes hand and power machine. 15-inch pipe can be threaded by hand.

SMALL MOTORS.—A recent bulletin issued by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Va., is devoted to the extensive line of small electric motors built by this company. The service of these motors is exceedingly varied and numerous applications are illustrated.

ELECTRIC DRILLS. — Various types of portable electric drills are described in a four-page bulletin recently issued by the Independent Pneumatic Tool Co., Chicago. The bulletin includes specifications and illustrations, together with a general description of the tools. The advantages of portable electric drills for shop service are also pointed out.

CLAM SHELL BUCKETS.—Bulletin No. 212 issued by the Industrial Works, Bay City, Mich., describes various types of clam shell buckets which are manufactured by this concern. The bulletin is completely illustrated and is provided with tables giving the dimensions and capacity of buckets of various sizes. Illustrations are also presented showing the buckets in actual service.

WIRE FORMING MACHINES.—Automatic, four-slide wire forming machines are illustrated and described in a catalog recently issued by the A. H. Nilson Machine Co., Bridgeport, Conn. These machines are designed to form a large variety of shapes from either flat or round wire. Examples of the work turned out by the machines are shown in the catalog, and the various features of the machines themselves also are fully described.

CONCRETE BINS.—Catalog S 1914, issued by the Brown Hoisting Machinery Co., Cleveland, describes various types of suspended concrete bins which are particularly adapted to handling coal and ashes in boiler plants. A large number of full page illustrations are presented showing interesting bin installations. The catalog contains 39 6 x 9-inch pages and the various features of the bins are fully described and illustrated.

EFFICIENCY METER. — A 16-page bulletin recently issued by W. A. Blonck & Co., Chicago, describes a boiler efficiency meter manufactured by this concern. This meter contains a direct and a differential draft gage by means of which changes in the operative efficiency of the boiler may be observed. The bulletin is completely illustrated and describes the principles underlying the construction of the meter together with its method of operation.

IRON CEMENT.—Instruction book No. 7, containing 64 pages, issued by the Smooth-On Mfg. Co., Jersey City, N. J., outlines in detail the application of iron cement for stopping leaks in concrete, brick or stone work, for waterproofing, dust-proofing, oil-proofing, etc. This cement also can be used for stopping leaks of steam, water, fire or oil in iron or steel. Instruction book No. 15, issued by this company, gives full details regarding the application of this material for this work.

PENUMATIC TOOLS.—The Ingersoll-Rand Co., 11 Broadway, New York City, recently has issued several bulletins which illustrate and describe riveting hammers, coal cutters, etc. One 20-page bulletin is devoted to the Ingersoll-Rogler type of air compressor, which is illustrated and described in detail. This compressor is built in four standard strokes, namely, 6, 8, 10 and 12 inches. The distinguishing feature of this compressor is the use of the Ingersoll-Rogler type of air valve.

MILLING MACHINES. — A new catalog recently has been issued by the Newton Machine Tool Works, Philadelphia, which describes the extensive line of Newton milling machines in an attractive manner. A large group of interesting illustrations showing the machines at work are presented. The catalog also describes portable slotting machines, link grinding machines, locomotive cylinder boring machines, tool room boring machines, crank planing machines, and a large variety of cold metal sawing machines.

WINCHES AND WINDING DRUMS. — Bulletin No. 48,901, issued by the Sprague Electric Works, of General Electric Co., 527 West Thirty-fourth street, New York, describes and illustrates the latest type of Sprague electric winches and winding drums. These devices are particularly useful in manufacturing plants for shifting freight cars without the aid of a locomotive. The bulletin contains a large number of full page illustrations showing interesting applications of electric winding drums and winches.

HAND TRAVELING CRANE.—Catalog P, issued by the Brown Hoisting Machinery Co., Cleveland, describes the overhead hand traveling cranes manufactured by this concern. These cranes are the result of 34 years' experience and they embody many novel features of design. Several pages in the catalog are devoted to a description of the Brown single I-beam, hand traveling crane with patented cast steel ends. The price lists and specifications which are included in the book will be found of value to designers and estimators. The catalog contains 39, 6 x 9-inch pages.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery Through Third Quarter.)

Bessemer, valley	$14.00
Bessemer, Pittsburgh	14.90
Basic, Pittsburgh	13.90
Basic, eastern Pa.	14.00 to 14.25
Malleable, Pittsburgh	13.90 to 14.40
Malleable, Chicago	14.00
Malleable, Philadelphia	14.75 to 15.00
Malleable, Buffalo	13.00
No. 1X Philadelphia	14.75 to 15.00
No. 2 foundry, Pittsburgh	13.90 to 14.40
No. 2 foundry, Cleveland	13.75 to 14.25
No. 2 foundry, Ironton	13.00 to 13.50
No. 2 foundry, Chicago	14.00
No. 2X foundry, Philadelphia	14.50 to 14.75
No. 2X foundry, New York	14.25 to 14.75
No. 2X foundry, Buffalo	13.00
No. 2 plain, Philadelphia	14.50 to 14.75
No. 2 plain, New York	14.00 to 14.25
No. 2 plain, Buffalo	12.50 to 12.75
No. 2 southern, Birmingham	10.00 to 10.50
No. 2 southern, Cincinnati	13.25 to 13.75
No. 2 southern, Chicago	14.85 to 15.85
No. 2 southern, Philadelphia	15.00 to 15.25
No. 2 southern, Cleveland	14.60 to 14.85
No. 2 southern, New York	14.75 to 15.00
No. 2 southern, St. Louis	14.50 to 15.00
Virginia 2X, Philadelphia	15.30 to 15.55
Virginia, 2X, Jersey City	15.30 to 15.75
Virginia, 2X, New Eng., all rail	15.75 to 16.25
Gray forge (eastern Pa.)	13.75
Gray forge, Pittsburgh	13.65
Gray forge, Birmingham	9.00 to 9.50
Silveries, 8 per cent, Cleveland	17.55
Silveries, 5 per cent, Birmingham	12.50
Silveries, 5 per cent, Chicago	16.35
Standard low phos., Phila.	20.50
Lebanon low phos., furnace	17.00 to 17.50
Low phos., Pittsburgh	21.65 to 21.90
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.75 to 16.50
Charcoal, Buffalo	15.75 to 16.75
Charcoal, Birmingham	25.00
Middlesbrough, No. 3, Phila., ex-ship	15.00 to 15.25

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent	$3.75
Mesabi Bessemer, 55 per cent	3.50
Old range, non-Bess., 51½ per cent	3.00
Mesabi, non-Bessemer, 51½ per cent	2.85

(Per unit Philadelphia.)

Foreign Bess., 50 to 65 per cent	7 to 8c
Foreign non-Bess., 50 to 65 per cent.	7 to 8c

COKE

(At the ovens.)

Connellsville furnace	$1.75 to 1.85
Connellsville fur. contr.	1.85 to 2.00
Connellsville foundry	2.25 to 2.50
Connellsville fdy., contr.	2.40 to 2.65
Wise county furnace	1.90 to 2.10
Wise county foundry	2.25 to 2.75
Pocahontas furnace	1.90 to 2.05
Pocahontas foundry	2.25 to 2.40
New River, foundry	2.75 to 3.50
New River, furnace	2.20 to 2.35

FERRO-ALLOYS

Ferro-manganese, Baltimore	$37.00 to 38.00
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent, Pgh.	22.90
Ferro-sil., 11 to 12 per cent, Pgh.	21.90
Ferro-sil., 10 to 11 per cent, Pgh.	20.90
Ferro-sil., 9 to 10 per cent, Pgh.	19.90
Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Bess. billets, Pbgh. and Yn.	$19.00 to 19.50
Open-hearth bil., Pbgh. and Yn.	19.00 to 19.50
Open-hearth bil., Phila.	21.90 to 22.40
Bess. sheet bars, Pbgh. and Yn.	20.00 to 20.50
Op.-h'th sh. bars, Pbgh. and Yn.	20.00 to 20.50
Forging billets, Phila.	24.90 to 25.90
Forging billets, Pittsburgh	24.00 to 25.00
Wire rods, Pittsburgh	24.50 to 25.00

RAILS AND TRACK MATERIAL

Stand.- Bess., rails, Pbgh.	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Light rails, 8 lbs., Pbgh. or Chi.	1.40c
Lgt. rails, 12 lbs., Pbgh. or Chgo.	1.35c
Lgt. rails, 16 to 20 lb., Pbgh. or Chicago	1.30c
Lgt. rails, 25 to 45 lbs., Pbgh. or Chicago	1.25c
Relaying rails, standard, Chgo.	$23.00 to 24.00
Relaying rails, light, Chicago	21.50 to 22.50
Angle bars, st. sect. Pbgh., base	1.50c
Angle bars, st. sections, Chgo.	1.50c
Spikes, railroad, Pbgh.	1.40c to 1.45c
Spikes, railroad, Chgo.	1.55c
Track bolts, Pbgh.	2.00c
Track bolts, Chgo.	2.00c

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.15c
Structural shapes, Chicago	1.28c to 1.33c
Structural shapes, Philadelphia	1.25c to 1.30c
Structural shapes, New York	1.26c to 1.31c
Structural shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.28c to 1.33c
Tank plates, Pittsburgh	1.15c
Tank Plates, Philadelphia	1.25c to 1.30c
Tank plates, New York	1.26c to 1.31c
Bars, soft steel Pittsburgh	1.15c
Bars, soft steel, Chicago	1.28c to 1.33c
Bars, soft steel, Philadelphia	1.30c
Bars, soft steel, New York	1.31c
Hoops, carloads, Pittsburgh	1.25c

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Baltimore	14½ cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
Minneapolis and St. Paul	32 cents
Denver	67½ cents
St. Louis	22½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, plates and shapes	80 cents

Hoops, less carloads, Pittsburgh	1.30c
Bands, Pittsburgh	1.15c
Shafting, carloads, Pbgh., disc. contract	66 to 67 off
Shaft'g less carl'ds, Pbgh., disc.	63
Bar iron, Chicago	1.05c to 1.10c
Bar iron, Philadelphia	1.15c to 1.20c
Bar iron, New York	1.25c to 1.30c
Bar iron, Cleveland	1.20c
Bar iron, Pittsburgh	1.20c to 1.25c
Hard steel bars, Chicago	1.25c to 1.30c
Smooth finish'g mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.80c to 1.85c
No. 28, black, Chicago	1.93c to 1.98c
No. 28, tin mill, black, Pbgh.	1.80c to 1.85c
No. 28, galvanized, Pbgh.	2.75c to 2.85c
No. 28, galvanized, Chgo.	2.88c to 2.93c
No. 10, blue, annealed Pbgh.	1.35c
No. 10, blue, annealed Phila.	1.50c
Tin plate, 100 lb., coke, base	$3.25 to 3.30

IRON AND STEEL PIPE

(Pittsburgh.)

	Black Butt-weld.	Galv. Butt-weld.
Steel, ¾ to 3 inches	80	71½
Iron, ¾ to 2½ inches	70	61
	Lap-weld.	
Steel, 2½ to 6 inches	79	70½

BOILER TUBES

Steel, 3½ to 4½ inches	73
Iron, 3½ to 4½ inches	60

WIRE PRODUCTS

Wire nails, jobbers, Pittsburgh	$1.55
Wire nails, retailers, Pittsburgh	1.60
Plain wire, jobbers, Pittsburgh	1.35
Plain wire, retailers, Pittsburgh	1.40
Galvanized wire, jobbers, Pbgh.	1.75
Galvanized wire, retailers, Pbgh.	1.80
Polished staples, Pbgh.	1.55
Galvanized staples, Pbgh.	1.95
Barb wire, painted, jobbers, Pbgh.	1.55
Barb wire, painted, retail'rs, Pbgh.	1.60
Barb wire, galv., retail's, Pbgh.	2.00
Barb wire, galv., jobbers, Pbgh.	1.95

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, 3/8 x 6 inches, smaller or shorter, rolled threads, 80 and 20; cut threads, 80 and 15; larger or longer, 75 and 15.

Machine bolts with hot pressed nuts 3/8 x 4 inches, smaller or shorter, rolled, 80 and 25; cut, 80 and 20; larger or longer, 80.

Gimlet and cone point lag or coach screws, 80 and 25.

Hot pressed square, blank or tapped nuts, $6.30 off list; hot pressed hexagon blank or tapped, $7.20 off.

Cold pressed, c. and t. square, blank or tapped, $6 off; hexagon, blank or tapped, ⅝ inch and larger, $7.20; 9/16-inch and smaller, $7.80.

RIVETS

Structural rivets, Pbgh.	1.50c to 1.60c
Structural rivets, Chgo.	1.68c
Boiler rivets, Pbgh.	1.60c to 1.70c
Boiler rivets, Chgo.	1.78c

SCREWS

(New York.)

Lag, gimlet and cone point.	80 and 20
Coach, gimlet point.	80
Standard Jack	70 and 10
Mch., cut thread, flat head.	50 and 10
Mach., cut thread, round head	50 and 10 and 10
Mch., cut thread, fillister hd.	40 and40 and 10
Mch., rolled thread, flat head or round head.	80 and 10
Set screws, iron.	75 and 10 and 10
Set screws, steel, per cent advance over iron.	25
Square head cap screws.	70 and 10 and 10
Hexagon head cap screws.	70 and 10 and 10
Fillister head cap screws.	60 and 10 and 10
Flat head wood screws.	10 and 10 and 5
Round head wood screws.	10 and 10 and 5

CAR WHEELS

33-inch Engine truck wheels	$22.00 to $24.00
36-inch engine truck wheels	23.00 to 25.00
33-inch tender wheels	18.00 to 18.50
36-inch passenger train car and tender wheels	20.30 to 20.50
33-inch freight car wheels	15.50 to 16.00

All f. o. b. Pittsburgh.

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.55c to 1.60c

TWISTED REINFORCING BARS

(Soft steel, Pittsburgh mill.)

¾-inch and larger	1.15c to 1.25c
⅝-inch	1.20c to 1.30c
½-inch	1.25c to 1.35c
⅜-inch	1.40c to 1.50c
¼-inch	1.65c to 1.75c

IRON AND STEEL PRICES

Corrected up to Tuesday noon

TACKS

(New York.)—

	Discount.
American carpet tacks.	90 and 20 and 10 and 10
American cut tacks...	90 and 20 and 10 and 10
Railroad tacks	90 and 50 and 10
Gimp tacks	90 and 20 and 10 and 10
Finishing nails	70

WIRE ROPE

Galvanized, iron and steel	47½ and 2½
Bright, Iron and steel	55 and 2½

TRIANGLE REINFORCING MESH

(Per 100 square feet f. o. b. mill, car loads.)

No. 4, plain	$1.00
No. 4, galvanized	1.12
No. 7, plain	.49
No. 7, galvanized	.55
No. 23, plain	1.69
No. 23, galvanized	1.88
No. 26, plain	1.17
No. 26, galvanized	1.30
No. 27, plain	.96
No. 27, galvanized	1.07
No. 31, plain	2.49
No. 31, galvanized	2.76
No. 35 plain	1.17
No. 35, galvanized	1.30
No. 39, plain	3.05
No. 39 galvanized	3.38
No. 43, plain	1.10
No. 43, galvanized	1.23

SPIRAL RIVETED PIPE

(Per 100 linear feet, f. o. b. factory.)

4-inch, plain	$ 19.76
4-inch, galvanized	30.74
6-inch, plain	33.05
6-inch, galvanized	49.73
8-inch, plain	43.17
8-inch galvanized	65.00
10-inch, plain	66.42
10-inch, galvanized	96.15
12-inch, plain	83.75
12-inch galvanized	118.30
14-inch, plain	99.14
14-inch, galvanized	138.85
16-inch, plain	117.53
16-inch, galvanized	166.58
20-inch, plain	183.79
20-inch, galvanized	248.39
24-inch, plain	219.92
24-inch, galvanized	293.99
30-inch, plain	324.81
30-inch, galvanized	430.64

CAST IRON PIPE

Three to 24 in., Cleveland	$ 22.35 to 22.80
Four-inch, water, Chicago	26.50
Six to 12 inches, Chicago	24.50
Larger sizes, Chicago	24.00
Six-inch, water, New York	20.50 to 21.50
Four-inch, water, Birmingham	19.50
Six-inch and larger, Birmingham.	19.50
Gas pipe, $1 per ton higher than water.	

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.70c to 1.85c
Steel bars, Philadelphia	1.65c
Steel bars, New York	1.80c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, Cincinnati	1.65c to 1.75c
Iron bars, Philadelphia	1.60c to 1.65c
Iron bars, New York	1.65c to 1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.80c to 1.90c
Shapes and plates, Philadelphia.	1.65c
Shapes and plates, New York	1.85c
No. 10 blue ann. sheets, Chgo..	1.85c
No. 10 blue ann. sheets, Cleve..	2.15c
No. 10 blue ann. sheets, Cinci..	1.95c
No. 28 black sheets, Chgo	2.45c
No. 28 black sheets, Cleveland..	2.60c
No. 28 black sheets, Cincinnati..	2.45c to 2.55c
No. 28 galv. sheets, Chgo	3.45c
No. 28 galv. sheets, Cleveland	3.60c
No. 28 galv. sheets, Cincinnati..	3.40c to 3.55c

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo	$ 9.00 to 9.50
No. 1 railroad wrought, Cleve..	9.50 to 10.00
No. 1 railroad wrought, St. L.	7.75 to 8.00
No. 1 railroad wrought, Cinci..	8.00 to 8.50
No. 2 railroad wrought, Chgo...	8.50 to 9.00
No. 2 railroad wrought, St. L...	7.50 to 7.75
Arch bars and transoms, Chgo..	12.00 to 12.25
Arch bars and transoms, St. L.	11.00 to 11.50
Knuckles, coup. and spr'gs, Chgo.	9.00 to 9.50
Knuckles, coup. & spr'gs, St. L.	9.25 to 9.50
Shafting, Chicago	11.75 to 12.25
Shafting, St. Louis	13.00 to 13.50
Steel car axles, Chgo	12.00 to 12.25
Steel car axles, St. Louis	11.75 to 12.25
Locomotive tires, Chicago	9.25 to 9.50
Locomotive tires, St. Louis	8.75 to 9.25
Cut forge, Chicago	8.50 to 9.00
Pipes and flues, Chicago	6.75 to 7.00
Pipes and flues, Cleveland	7.75 to 8.25
Pipes and flues, St. Louis	5.75 to 6.25
No. 1 cast, Chicago	9.75 to 10.00
No. 1 cast, Cleveland	10.00 to 10.50

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

No. 1 cast, Cincinnati	$ 8.50 to 9.00
No. 1 cast, St. Louis	9.50 to 10.00
No. 1 busheling, Chicago	7.50 to 7.75
No. 1 busheling, Cleveland	8.25 to 8.50
No. 1 busheling, Cincinnati	5.75 to 6.25
No. 1 busheling, St. Louis	7.25 to 7.50
No. 2 busheling, Chicago	6.00 to 6.25
No. 1 boiler plate, cut, Chgo	6.50 to 7.00
No. 1 boiler plate, cut, Buffalo.	9.00 to 9.50
No. 1 boiler plate, cut, St. L.	6.00 to 6.50
Boiler punchings, Chicago	9.00 to 9.25
Cast borings, Chicago	4.75 to 5.25
Cast borings, Cleveland	6.00 to 6.25
Cast borings, Cincinnati	4.25 to 4.75
Cast borings, St. Louis	4.00 to 4.50
Machine shop turnings, Chgo	5.25 to 5.50
Machine shop turnings, Cleve	5.00 to 5.25
Machine shop turnings, Cinci..	4.25 to 4.75
Machine shop turnings, St. L...	4.50 to 5.00
Malleable, agl., Chicago	7.75 to 8.25
Malleable, agricultural, St. Louis	7.50 to 8.00
Malleable, railroad, Chicago	8.75 to 9.00
Malleable, railroad, Cincinnati..	6.50 to 7.00
Malleable, railroad, St. Louis...	7.50 to 8.00
Angle bars, iron, Chgo	11.75 to 12.25
Angle bars, Iron, St. Louis	10.00 to 10.50
Angle bars, steel, Chgo	8.25 to 8.75
Angle bars, steel, St. Louis	9.25 to 9.50
Stove plate, Chicago	8.50 to 8.75
Stove plate, Cleveland	7.75 to 8.00
Stove plate, Buffalo	9.75 to 10.00
Stove plate, Cincinnati	6.50 to 7.00
Stove plate, St. Louis	8.25 to 8.75
Bundled sheet, Cincinnati	4.00 to 4.50
Wrought iron pil'g plates, Clev.	13.00

(Gross Tons.)

Heavy melting steel, Pbgh	$11.50 to 11.75
Heavy melting steel, Buffalo	10.00 to 10.50
Heavy melting steel, Chicago	9.50 to 9.75
Heavy melting steel, Cleveland.	10.00 to 10.50
Heavy melting steel, Cincinnati.	9.00 to 9.50
H'vy melting steel, eastern Pa.	10.00 to 10.50
Heavy melting steel, New York.	8.25 to 8.50
Heavy melting steel, St. Louis.	11.00 to 11.50
Bundled sheet, Buffalo	6.25 to 6.50
Grate bars, Buffalo	9.50 to 10.00
Grate bars, New York	5.25 to 5.50
No 1 railroad wr'ght, east. Pa..	11.50 to 12.00
No. 1 railroad wrought, Pbgh..	11.25 to 11.50
No. 1 R. R. wght., New York.	10.25 to 10.50
No. 1 R. R. wrought, Buffalo..	11.00 to 11.50
Shafting, New York	11.00 to 11.50
Pipes and flues, New York	7.00 to 7.25
Pipes and flues, eastern Pa	9.50 to 10.00
Mch. shop turnings, New York.	5.75 to 6.00
Machine shop turnings, Buffalo.	5.50 to 6.00
Mch. shop turnings, Pbgh	7.75 to 8.00
Mch. shop turnings, eastern Pa.	7.50 to 8.00
Cast borings, New York	5.50 to 5.75
Cast borings, eastern Pa	8.00 to 8.50
Cast borings, Buffalo	6.00 to 6.50
Cast borings, Pittsburgh	8.25 to 8.50
Stove plate, (Jersey points)	8.00 to 8.25
Stove plate, Pittsburgh	9.25 to 9.75
Stove plate, eastern Pa	8.50 to 9.00
Shoveling steel, Chicago	9.00 to 9.50
Shoveling steel, St. Louis	8.00 to 8.25
Reroll'g rails, 5 ft. & ov., Pbgh.	13.00 to 13.25
Reroll. rails, 5 ft. & ov., Chgo.	11.25 to 11.75
Reroll. rails, 5 ft. & ov., Cleve.	11.00 to 11.50
Reroll. rails, 5 ft. & ov., E. Pa.	12.00 to 12.50
Reroll. rails, 5 ft. & ov., St. L.	11.25 to 11.50
Steel rails, short, Chicago	10.25 to 10.50
Steel rails, short, Cleveland	12.50 to 13.00
Steel rails, short, St. Louis	10.50 to 10.75
Iron rails, Cleveland nom	13.25 to 13.75
Iron rails, Cincinnati	10.25 to 10.75
Iron rails, eastern Pa	15.00 to 16.00
Iron rails, St. Louis	11.00 to 11.25
Frogs, switches, guards, Chgo..	9.50 to 9.75
Frogs, switches & g'rds, St. L.	10.50 to 10.75
Car wheels, (iron), Pittsburgh..	11.00 to 11.25
Car wheels, (steel), Pittsburgh.	12.00 to 12.25
Car wheels, Chicago	10.75 to 11.00
Car wheels, eastern Pa	11.00 to 11.50
Car wheels, Buffalo	12.00 to 12.50
Car wheels (N. J. points)	10.50 to 11.00
Car wheels, St. Louis	11.00 to 11.25
Iron axles, Pittsburgh	20.50 to 21.00
Iron axles, Cincinnati	19.00 to 20.00
Iron axles, eastern Pa	20.00 to 21.00
Iron axles, Buffalo	21.50 to 22.00
Iron axles, Chicago	18.00 to 18.75
Steel car axles, New York	12.00 to 12.50
Steel car axles, Buffalo	15.00 to 15.50
Steel car axles, Cleveland	14.00 to 16.00
Steel car axles, eastern Pa	13.75 to 14.00
No. 1 busheling, Buffalo	8.50 to 9.00
No. 1 busheling, Pittsburgh	9.00 to 9.50
No. 2 busheling, Buffalo	6.00 to 6.50
Low phosphorus steel, Buffalo..	15.00 to 15.50
Low phosphorus steel, Pbgh	14.00 to 14.50
Low phos. steel, eastern Pa	14.50 to 15.00
No. 1 forge, eastern Pa	8.00 to 8.50
No. 1 cast, eastern Pa	12.00 to 12.50
No. 1 cast, Pittsburgh	11.25 to 12.25
No. 1 heavy cast (N. J. points)	11.00 to 11.50
Boiler plate, Cleveland	8.50 to 9.00
Mall. iron, agricul., Cleveland..	9.00 to 9.50
Mall. iron R. R., Cleveland	10.25 to 10.75
Malleable, railroad, Pittsburgh..	10.50 to 10.75
Mall. R. R., Buffalo	10.75 to 11.25
Mall., R. R. east. Pa	9.00 to 9.50
Bundled sheet, Pittsburgh	8.50 to 8.75
Bundled sheet, Cleveland	7.50 to 8.00

MISCELLANEOUS SHOP TOOLS

	Discount.
Standard files	80 and 5
Heavy hammers, 3 to 5 lb	80 and 10
Heavy hammers, over 5 lb	80 and 5
Gas pliers, 7-inch, per dozen	$2.00
Gas pliers, 12-inch, per dozen	3.50
Cold chisels, per pound	10c to 15c
Wrenches, aligator, discount	75 to 80
Wrenches, drop forged S	60

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SHEET AND TIN MILL PRODUCTS
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All styles manufactured from our own Sheet and Tin Mill Products.

Corrugated	Open Hearth Ternes
V Crimped	Roofing Tin in Rolls
Pressed Standing Seam	Metal Shingles
Roll Roofing	Metal Tile
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Other extensively manufactured products include Black and Galvanized Flat Sheets—Bright Coke and Charcoal Tin Plate

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By RICHARD MOLDENKE
A practical treatise on the processes involved in the manufacture of Malleable Cast Iron
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The Iron Trade Review
Cleveland, Ohio

Electricity in Modern Industry

(*Continued from page* 203)

steam engine, it makes no difference in the cost of power whether it is in operation from 8 a. m. to 6 p. m., or from 6 a. m. to 4 p. m. With electric power, in the former case the power demand would overlap with whatever lighting load the same supply circuit carries, but would not in the latter case, and the latter case thus would give a better load factor of the electric circuit, and thereby a lower cost of power. Again, with electric power, if very large power demands could be restricted to the period of light load on the electric supply systems, this would reduce the cost of power. Nothing like this exists with the steam engine.

Electrical energy thus makes the power users economically more dependent upon each other, and thereby exerts a strong force toward industrial co-ordination—that is, co-operation.

Another illustration of the industrial reorganization required to derive the full benefit of electric power is afforded by the traction problem. Very often a study of the electrification of a railway shows no economical advantage in the replacement of the steam locomotive by the electric locomotive, even when considering only passenger service. At the same time, an electric railway may parallel the same railway, offer better service at lower price, and show financially better returns than the steam railway. But so, also, in the early days of steam, the engine in place of the horse in front of the stage coach was no success, and still the stage coach has gone and the steam locomotive has conquered; but it did not by replacing the horse, but by developing a system suited to the characteristics of the steam engine. The same repeats now in the relation of steam traction and electric traction. The steam engine is most economical in the largest units, and the economy of steam railway operation depends on the concentration of the load in as few and as large units as possible; therefore, the largest locomotive which can pass through bridges and around curves. Exactly the reverse is the condition of economy of electric traction; the economy depends on the distribution of the load as uniformly as possible in space and in time—that is, small units at frequent intervals—and therefore, while steam traction has gone to larger and larger units, in electric traction even the trailer car, so frequently used in the early days, has practically vanished. Obviously, then, the electric motor cannot economically compete with the steam engine under the conditions of maximum economy of steam and minimum economy of electric operation, and electric traction under steam traction conditions shows marked economy only in the case of such heavy service that the maximum permissible train units follow each other at the shortest possible intervals—that is, give maximum uniformity of load—and thus the economic requirements of both forms of power coincide. These two instances may illustrate the changes which the introduction of electric power requires.

To conclude, then: Electric energy is the only form which is economically suited for general energy transmission and distribution. Civilization depends on the supply of materials and of energy as its two necessities. The supply of materials is taken care of by the transportation system of the world. The supply of energy is being developed by the electrical transmission system, which with regard to energy becomes what the railway system is with regard to materials. Introduction of electric power in place of other forms of power rarely can be mere substitution, but usually requires a change of the methods of power application, a reorganization of the industry, to secure maximum economy.

The Question of Guarantees

(*Continued from page* 212.)

a higher degree of salesmanship to get an order that way, although, it seems on first consideration that it should be the opposite. To secure an order with the broad unlimited guarantee, you must first convince your prospective customer that you have the best machine for his purposes. When you have done that, your guarantee of performance, which is a limitation, is of secondary consideration, and the question of whether or not the machine will make four or forty-five pieces in a given unit of time is not made the main issue. Instead consideration is given to the question of whether or not the machine is the best for its purpose. If it is the best, all things considered, your guarantee has not cost you anything to maintain, neither will it cost you anything on future sales, and in addition to this, the cost of getting future sales will be greatly reduced, and you can, therefore, credit the saving in securing these sales to the "Cost of Maintaining Unlimited Guarantees".

It will cost the manufacturer a considerable sum to make a limited guarantee of performance, as one with experience and judgment must give his most careful attention to each proposition if the guarantee is anything more than perfunctory.

The greatest objection in my mind to making guarantees of performance is that your customer too often loses sight of everything except the stated guarantee of performance and does not give due consideration to the machine itself.

There is a big advantage in using the broad, unlimited guarantee, in addition to its primary object. It will make you improve your machine faster than you otherwise would; it will make your representatives more careful in their statements of performance, and thus create a reputation for your machines, your ability to perform and your honesty, all of which reduce the cost of maintaining selling guarantees.

New Mexico Coke Production

The quantity of coke made in New Mexico in 1913 was 467,945 short tons, valued at $1,548,536, the maximum record both in quantity and value. Compared with 1912 the output in 1913 showed an increase of 54,039 tons, or 13 per cent in quantity and of $191,590, or 14.4 per cent in value, according to figures compiled by E. W. Parker in co-operation with the New Mexico Geological Survey.

All the coke made in New Mexico is from coal mined from the Raton field in Colfax county. This field is the southern part of the Raton Mountain coal region, which consists of the Raton field in New Mexico and the Trinidad field in Colorado. The coal measures are continuous, but the producing areas are separated by a high divide near the Colorado-New Mexico line. Slack coal is used in the manufacture of coke, and as over 25 per cent of the total output of the mines yielding coking coal goes into slack, an ample supply of fuel for the coke ovens is available.

All the ovens in the state are of the bee-hive type. At Dawson, however, 446 out of a total of 570 ovens, although of bee-hive type in construction, are provided with underflues through which the gases are conveyed to a large flue back of the ovens and then to the power house. The heat obtained from the oven gases renders the use of other fuel in the power plant unnecessary. The power plant, in addition to furnishing power for the operation of the mines, for ventilation, electric haulage, the coal crusher, washery, etc., furnishes also steam heat to the offices, commissary, hotel, hospital and theater, and electric light for the city of Dawson.

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We are prepared to give you splendid service at a very reasonable cost. What are your requirements?
Our Foundry is 160 x 80 ft. Our General Machine Shop is 400 x 80 ft., enabling us to turn out work up to 16 ft. in dia.
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Opportunities

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Minimum, 50 words, $1.00. Each additional word, 2c. All capitals, 50 words, $1.50. Each additional word, 3c.

Position Wanted
Minimum, 25 words, 50c. Each additional word, 2c. All capitals, 25 words, 75c. Each additional word, 3c.

Miscellaneous Classified
Minimum, 25 words, $1.00. Each additional word, 4c. All capitals, 25 words, $2.00. Each additional word, 8c.

Men Wanted

WANTED: — A-NO. 1 FOREMAN FOR gray iron foundry in middle west doing railroad work; open shop; must be a hustler; state age, experience and references, also salary wanted. Address Box 189, THE IRON TRADE REVIEW, Cleveland, O.

WANTED—A HEATER FOR 14-INCH mill. Buffalo Steel Co., Tonawanda, N. Y.

WANTED: — EXPERIENCED DETAIL draftsmen and designers for general mill work, new construction; good opportunity for the right men; no others need apply. Address Chas. E. Lehr, Chief Engineer, Bethlehem Steel Co., South Bethlehem, Pa.

WANTED—FIRST-CLASS CORE ROOM foreman for steel foundry. Reply to Box 206, THE IRON TRADE REVIEW, Cleveland.

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